

# REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 04/00/87		3. REPORT TYPE AND DATES COVERED	
4. TITLE AND SUBTITLE CONTAMINATION ASSESSMENT REPORT, PHASE I, SITE 1-10, SOUTH TANK FARM, TASK 2, SOUTH PLANTS, FINAL, VERSION 3.2				5. FUNDING NUMBERS  DAAK11 84 D 0017	
6. AUTHOR(S)					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  EBASCO SERVICES, INC. LAKEWOOD, CO				8. PERFORMING ORGANIZATION REPORT NUMBER  87127R01	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)  ROCKY MOUNTAIN ARSENAL (CO.). PMRMA COMMERCE CITY, CO				10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION / AVAILABILITY STATEMENT  APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  THIS FINAL REPORT DOCUMENTS THE PHASE I CONTAMINATION SURVEY OF SITE 1-10, A STORAGE TANK FARM CONSTRUCTED IN 1942. 30 SAMPLES FROM 13 BORINGS WERE ANALYZED FOR VOLATILE AND SEMIVOLATILE ORGANICS AND METALS WITH SEPARATE ANALYSES FOR AS, HG, AND DBCP. C6H6, DCPD, CH2CL2, CU, ZN, AND HG WERE DETECTED AT OR ABOVE THEIR RESPECTIVE INDICATOR RANGES. HOWEVER, THE CONCENTRATIONS OF CU AND ZN APPEAR TO BE CONSISTENT WITH THE NATURAL LEVELS OF THESE METALS. A PHASE II PROGRAM CONSISTING OF 22 ADDITIONAL BORINGS AND SOIL GAS SAMPLING IS RECOMMENDED TO 1) DETERMINE THE EXTENT OF CONTAMINATION AND 2) DISCOVER WHETHER POTENTIAL CONTAMINANTS HAVE LEAKED FROM THE TANKS. THE VOLUME OF POTENTIALLY CONTAMINATED SOIL PRESENT IS ESTIMATED AT 74,000 CUBIC YARDS. APPENDICES: CHEMICAL NAMES, PHASE I CHEMICAL DATA, COMMENTS AND RESPONSES.					
14. SUBJECT TERMS  GEOLOGY, HYDROLOGY, GEOPHYSICAL EXPLORATION, SOIL SAMPLING, ANALYTES, CHEMICAL DATA				15. NUMBER OF PAGES	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT  UNCLASSIFIED		18. SECURITY CLASSIFICATION OF THIS PAGE		19. SECURITY CLASSIFICATION OF ABSTRACT	
20. LIMITATION OF ABSTRACT					

DTIC  
ELECTE  
MAR 10 1995  
S G D

19950308 122

# DISCLAIMER NOTICE



**THIS DOCUMENT IS BEST QUALITY AVAILABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.**

# LITIGATION TECHNICAL SUPPORT

C.A.R.

## ROCKY MOUNTAIN ARSENAL

FINAL  
PHASE I  
CONTAMINATION ASSESSMENT REPORT  
SITE 1-10  
SOUTH TANK FARM  
VERSION 3.2

April 1987  
Contract No. DAAK11-D-0017  
TASK NO. 2 - SOUTH PLANTS

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input checked="" type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

**EBASCO SERVICES INCORPORATED**  
R.L. STOLLAR AND ASSOCIATES  
CALIFORNIA ANALYTICAL LABORATORIES, INC.  
UBTL INC. TECHNOS INC. GERAGHTY & MILLER, INC.

DISTRIBUTION LIMITED TO GOVERNMENT AGENCIES ONLY.  
REQUESTS FOR COPIES OF THIS DOCUMENT  
SHOULD BE REFERRED TO PROGRAM MANAGER  
FOR ROCKY MOUNTAIN ARSENAL CLEANUP, AMXFM-FM,  
ABERDEEN PROVING GROUND, MARYLAND 21010

DAAK11-84-D-0017

PREPARED FOR

PROGRAM MANAGER'S  
OFFICE FOR  
ROCKY MOUNTAIN ARSENAL CLEANUP



LITIGATION TECHNICAL SUPPORT AND SERVICES

ROCKY MOUNTAIN ARSENAL

87127R01  
ORIGINAL

FINAL  
PHASE I  
CONTAMINATION ASSESSMENT REPORT  
SITE 1-10  
SOUTH TANK FARM  
VERSION 3.2

**FILE COPY**

April 1987  
Contract No. DAAK11-D-0017  
TASK NO. 2 - SOUTH PLANTS

Rocky Mountain Arsenal  
Information Center  
Commerce City, Colorado

Prepared by:

EBASCO SERVICES INCORPORATED  
R. L. STOLLAR AND ASSOCIATES  
CALIFORNIA ANALYTICAL LABORATORIES, INC.  
UBTL INC.    TECHNOS INC.    GERAGHTY & MILLER, INC.

Prepared for:

U.S. ARMY PROGRAM MANAGER'S OFFICE FOR  
ROCKY MOUNTAIN ARSENAL CONTAMINATION CLEANUP

THE VIEWS, OPINIONS, AND/OR FINDINGS CONTAINED IN THIS REPORT ARE THOSE OF THE AUTHOR(S) AND SHOULD NOT BE CONSTRUED AS AN OFFICIAL DEPARTMENT OF THE ARMY POSITION, POLICY, OR DECISION, UNLESS SO DESIGNATED BY OTHER DOCUMENTATION.

THE USE OF TRADE NAMES IN THIS REPORT DOES NOT CONSTITUTE AN OFFICIAL ENDORSEMENT OR APPROVAL OF THE USE OF SUCH COMMERCIAL PRODUCTS. THE REPORT MAY NOT BE CITED FOR PURPOSES OF ADVERTISEMENT.

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>EXECUTIVE SUMMARY</u>	
1.0 <u>PHYSICAL SETTING</u> . . . . .	1
1.1 LOCATION . . . . .	1
1.2 GEOLOGY . . . . .	1
1.3 HYDROLOGY . . . . .	5
2.0 <u>HISTORY</u> . . . . .	8
3.0 <u>SITE INVESTIGATION</u> . . . . .	14
3.1 PREVIOUS SOIL INVESTIGATIONS . . . . .	14
3.2 PHASE I SURVEY . . . . .	15
3.2.1 <u>Phase I Program</u> . . . . .	15
3.2.2 <u>Phase I Field Observations</u> . . . . .	16
3.2.3 <u>Geophysical Exploration</u> . . . . .	17
3.2.4 <u>Phase I Analyte Levels and Distribution</u> . . . . .	18
3.2.5 <u>Phase I Contamination Assessment</u> . . . . .	24
3.3 PHASE II SURVEY . . . . .	29
3.4 QUANTITY OF POTENTIALLY CONTAMINATED SOIL . . . . .	34
4.0 <u>REFERENCES CITED</u> . . . . .	37
Appendix 1-10-A Chemical Names and Abbreviations	
Appendix 1-10-B Phase I Chemical Data	
Appendix 1-10-C Comments and Responses	

## LIST OF TABLES

<u>Table</u>		<u>Page</u>
1-10-1	Analysis of Data on Chemical Constituents Detected During Phase I Field Study . . . . .	19
1-10-2	Results of Phase I Field Study . . . . .	20
1-10-3	Tentative Identification of Nontarget Compounds . . . . .	26

## EXECUTIVE SUMMARY

### SITE 1-10

#### SOUTH TANK FARM

Site 1-10, the south tank farm, is located in the northwestern quarter of Section 1 at the Rocky Mountain Arsenal. It has included eleven different tank locations and a pumphouse that were reportedly used to store fuel, alcohol, bicycloheptadiene bottoms, dicyclopentadiene, water, D-D soil fumigant, dibromochloropropane, and sulfuric acid. This site was investigated under Task 2 in the spring of 1985. Thirteen borings, yielding 30 samples, were drilled to depths ranging from 5 to 10 feet.

Benzene, dicyclopentadiene, dieldrin, and methylene chloride were detected in samples from Site 1-10. Copper, zinc, and mercury were also detected at concentrations above their indicator ranges. Copper and zinc were detected at concentrations that are similar to natural levels known to occur generally in the Task 2 sampling area soils; however, the other detected analytes warrant further investigation in a Phase II program.

A Phase II program of 22 additional borings, yielding 60 samples, is proposed to assess the vertical and lateral extents of mercury and the volatile and semivolatile analytes detected in Site 1-10, as well as of organochlorine pesticides, methylisobutyl ketone, and mercury that were detected in adjacent Site 1-8. Based on the results of the Phase I program, the quantity of potentially contaminated soil is revised downward from 175,000 to 74,000 cubic yards.

# PHASE I CONTAMINATION ASSESSMENT REPORT

## SITE 1-10

### SOUTH TANK FARM

#### 1.0 PHYSICAL SETTING

##### 1.1 LOCATION

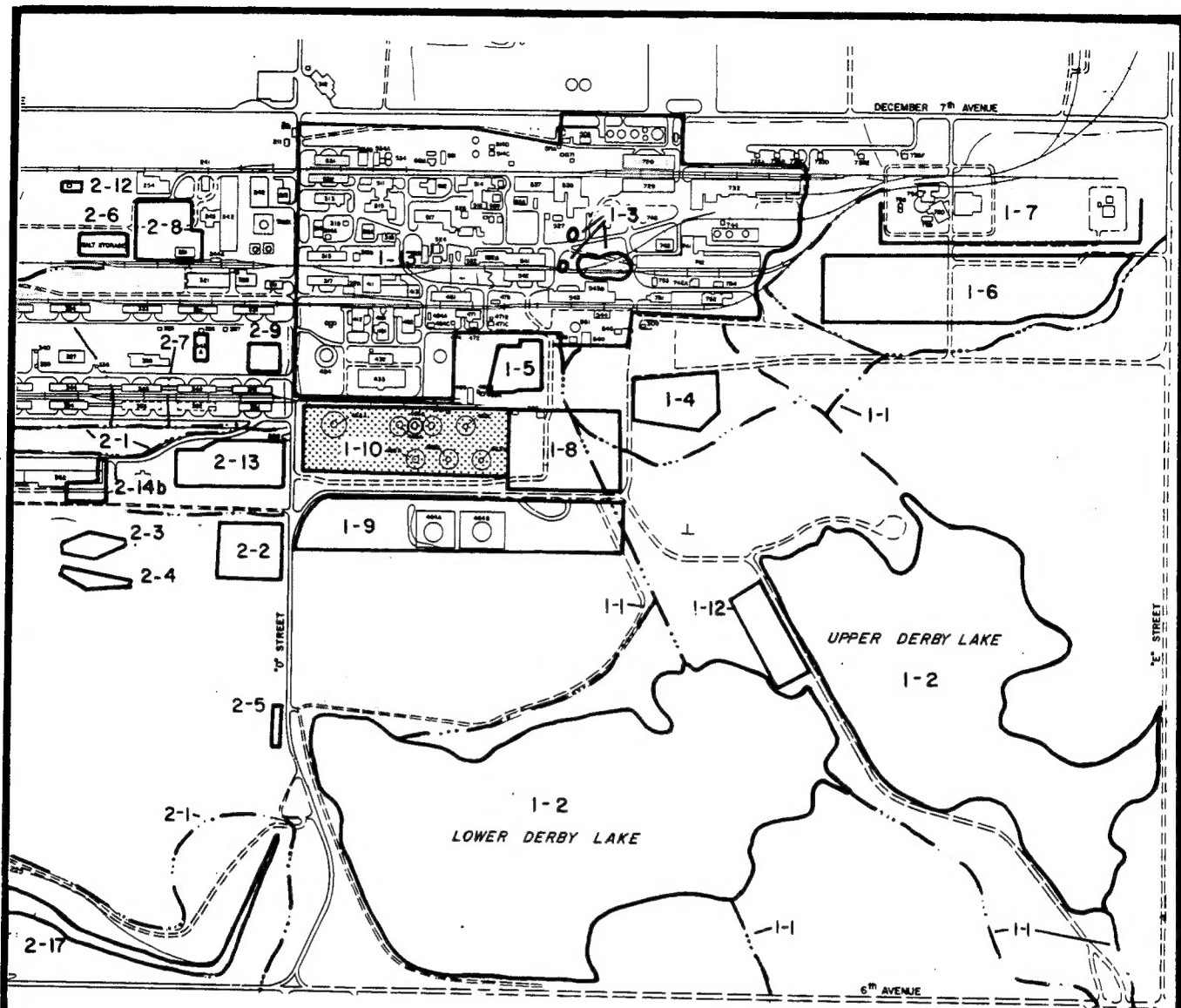
Site 1-10, the south tank farm, is located in the northwestern quarter of Section 1 at the Rocky Mountain Arsenal (RMA). The site is north of Lower Derby Lake and immediately west of Site 1-8, the salvage yard, as shown in Figure 1-10-1. Tanks 462A, 462B (relocated), 463A, 463B, 463C, 463D (relocated), 463E (relocated), 463F, 463G, and 463H were originally located at this site, but tanks have been moved within the site and removed to other locations over time. Building 461, a pumphouse, is located in the site northeast of Tank 463B and south of an east-west railroad spur that serves the area. Site 1-10 is a rectangle 1300 feet (ft) by 340 ft that covers an area of 442,000 square feet (ft<sup>2</sup>). It lies at an elevation of about 5265 ft above mean sea level (msl) with a local relief of approximately 10 ft (Figure 1-10-2). Site 1-10 was investigated under Task 2 in the spring of 1985.

##### 1.2 GEOLOGY

The two uppermost stratigraphic units beneath the south tank farm are Pleistocene alluvium and the Denver Formation (May, 1982/RIC 82295R01). Wells completed in the area indicated an alluvial thickness of approximately 4 ft (Well 01529) to 11 ft (Well 01535) (see Section 1.3). The site is located near the top of a large east-west trending Denver Formation bedrock ridge (May et al., 1983/RIC 83299R01). The deepest Phase I boring completed within Site 1-10 penetrated 10 ft of alluvium consisting mainly of sandy clay and clay. This boring is pictured in Figure 1-10-3 as it shows the greatest thickness of section. The other borings completed at the site drilled through sand, silty sand, and clay, with subordinate clayey silty sand and silty to sandy clay.

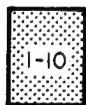
The underlying bedrock of the Denver Formation consists mainly of interbedded claystone, sandstone, and sandy claystone. Borings and wells drilled in the





# ROCKY MOUNTAIN ARSENAL LOCATION

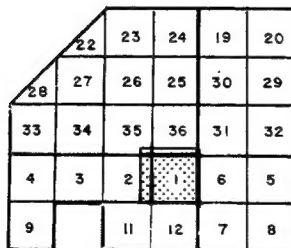
## Legend



Site Boundary



Tank



1" = 4 MILES



Prepared for:

Program Manager's Office for  
Rocky Mountain Arsenal Cleanup  
Aberdeen Proving Ground, Maryland

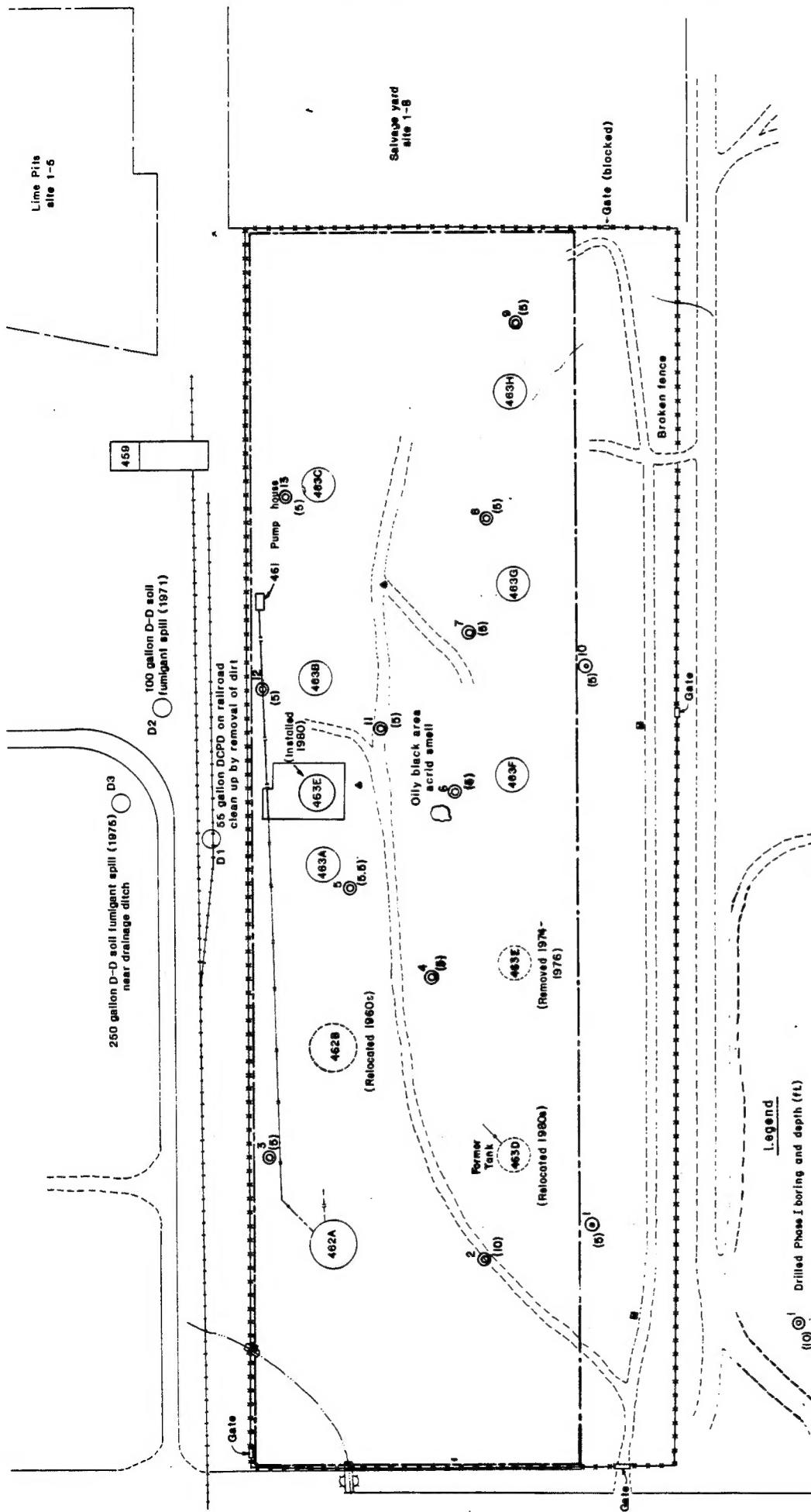
Drafted: 11/21/86

FIGURE 1-10-1

Location Map

Rocky Mountain Arsenal, Task 2

Prepared by: Ebasco Services Incorporated



# Legend

(10) Drilled Phase I boring and depth (ft.)

132 Fire hydrant

Barbed wire fence

Culvert

Ditch

Railroad tracks

Site boundary

Former tank location and number

Tank and number

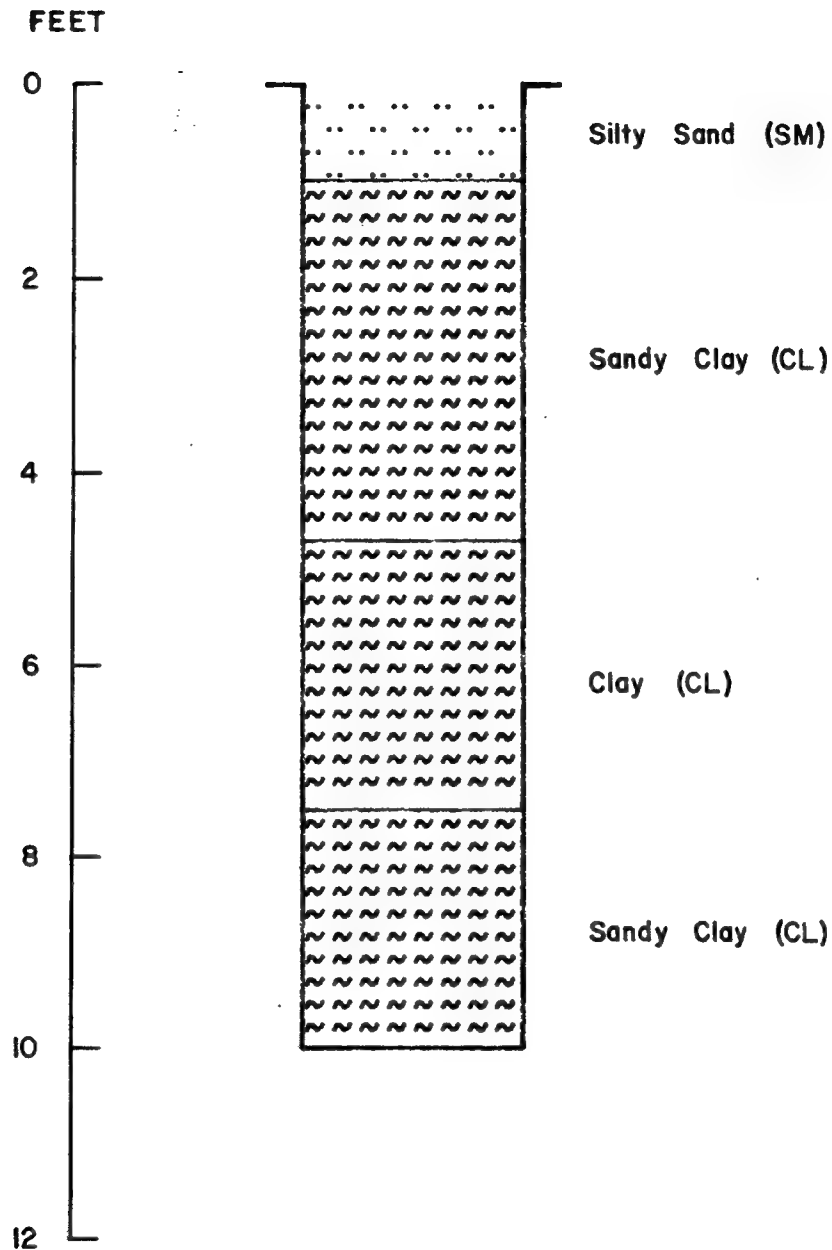


Prepared for:

Program Manager's Office for  
Rocky Mountain Arsenal Cleanup  
Aberdeen Proving Ground, Maryland

FIGURE 1-10-2  
Vicinity Map Showing Phase I  
Boring Locations

Rocky Mountain Arsenal, Task 2  
Prepared by: Ebasco Services Incorporated



**Prepared for:**

Program Manager's Office for  
Rocky Mountain Arsenal Cleanup  
Aberdeen Proving Ground, Maryland

Drafted: 12/20/86

**FIGURE 1-10-3**

**Field Boring Profile for Boring 2**

**Rocky Mountain Arsenal, Task 2**

**Prepared by: Ebasco Services Incorporated**

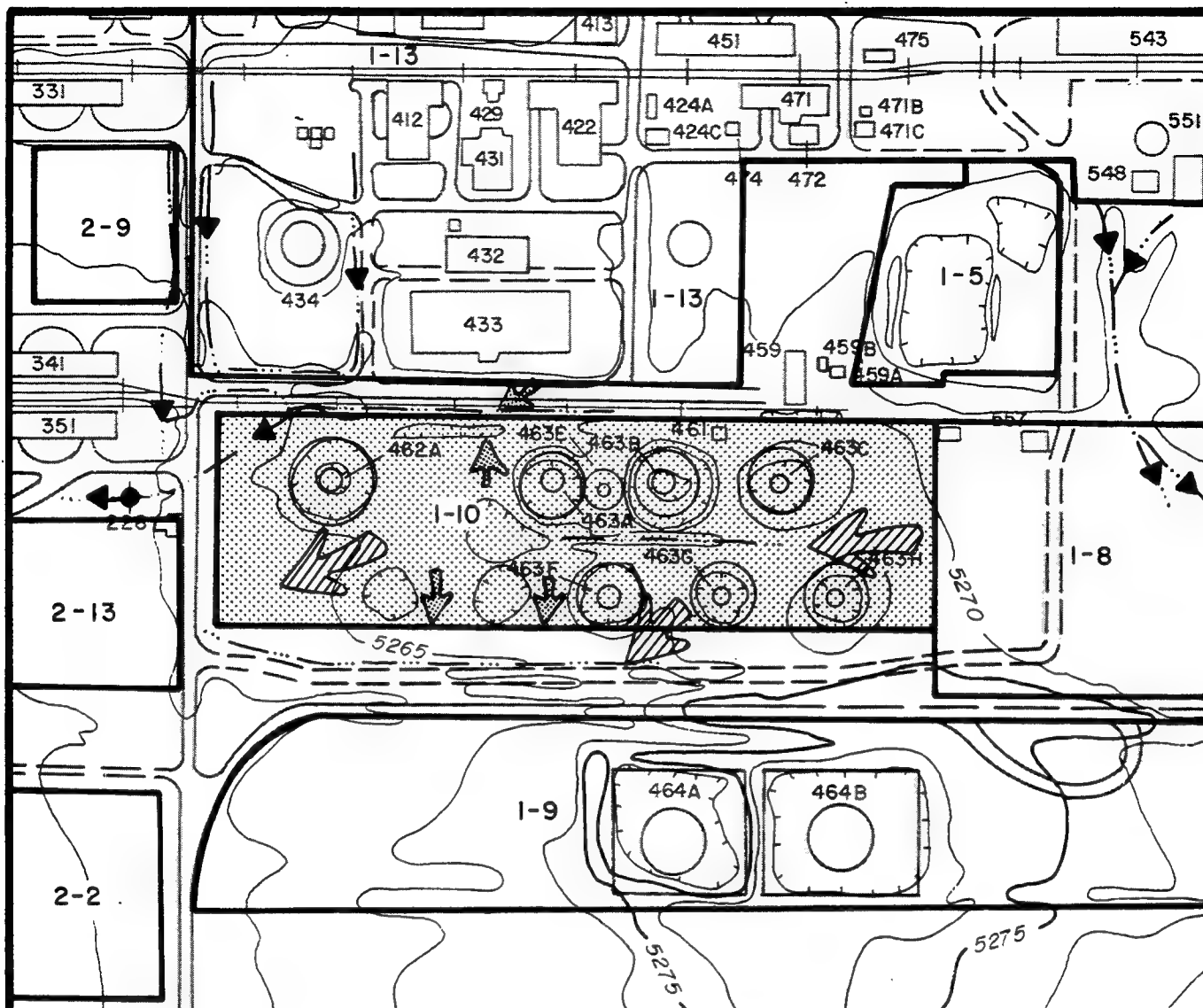
vicinity of Site 1-10 do not penetrate the formation completely; thus the total thickness of the unit beneath this area is unknown. A detailed description of the Denver Formation is found in May (1982/RIC 82295R01). Monitoring Well 01012 (see Section 1.3), installed near the northwest corner of the site, penetrated approximately 25 ft of bedrock composed mainly of mudstone with minor claystone.

### 1.3 HYDROLOGY

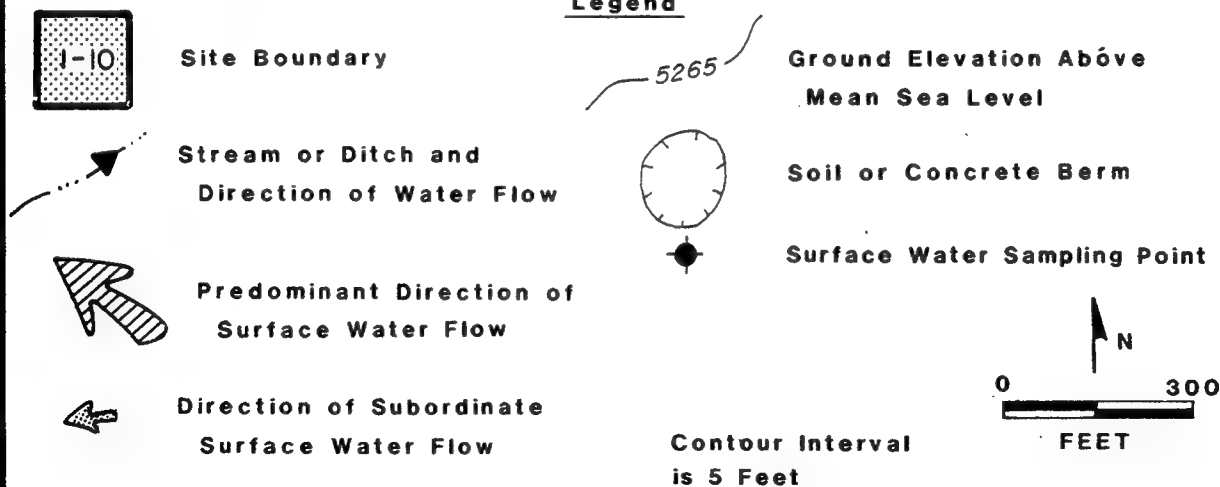
The predominant direction of surface water flow in Site 1-10 is toward the west and south. Water flowing south out of the site enters the west-flowing ditch south of the site boundary. This ditch terminates near the southwest corner of the site. A small part of the northern and western portions of the site are drained by a west-flowing ditch located just north of the site. This ditch eventually empties into Sand Creek Lateral on the western edge of the South Plants manufacturing complex. Surface water sampled by Shell Chemical Company in August 1979 near the western border of Site 1-10 (Figure 1-10-4) contained dieldrin, bladex, and benzene (Spaine & Gregg, 1983/RIC 83228R01).

The primary groundwater flow direction across RMA is toward the northwest, but in the vicinity of the South Plants manufacturing complex, a groundwater mound diverts the direction of the regional groundwater flow (Figure 1-10-5). As a result, groundwater below Site 1-10 flows radially in a southeast-to-southwest direction (ESE, 1986b/RIC 86317R01). In the spring of 1986, depth to water in Monitoring Well 01012, located in the northwest corner of the site, was measured at an elevation of 5258.4 ft msl, or 5.6 ft below the ground surface. Water was reached in Phase I Boring 2 at 5254.0 ft msl, or 7.5 ft below the ground surface.

Upgradient from Site 1-10, organic compounds were detected in groundwater quality samples from Wells 01518, 01526, and 01530 (Silveira, 1981/RIC 83041R01). The compounds found in these wells were chloroform, benzene, carbon tetrachloride, chlorobenzene, dichlorobenzene, bicyclohexane, dicyclopentadiene, methylene chloride, toluene, dimethyl ketone, and tetrahydrofuran. Within the site itself the organic compounds bicyclohexane,



#### Legend



#### Prepared for:

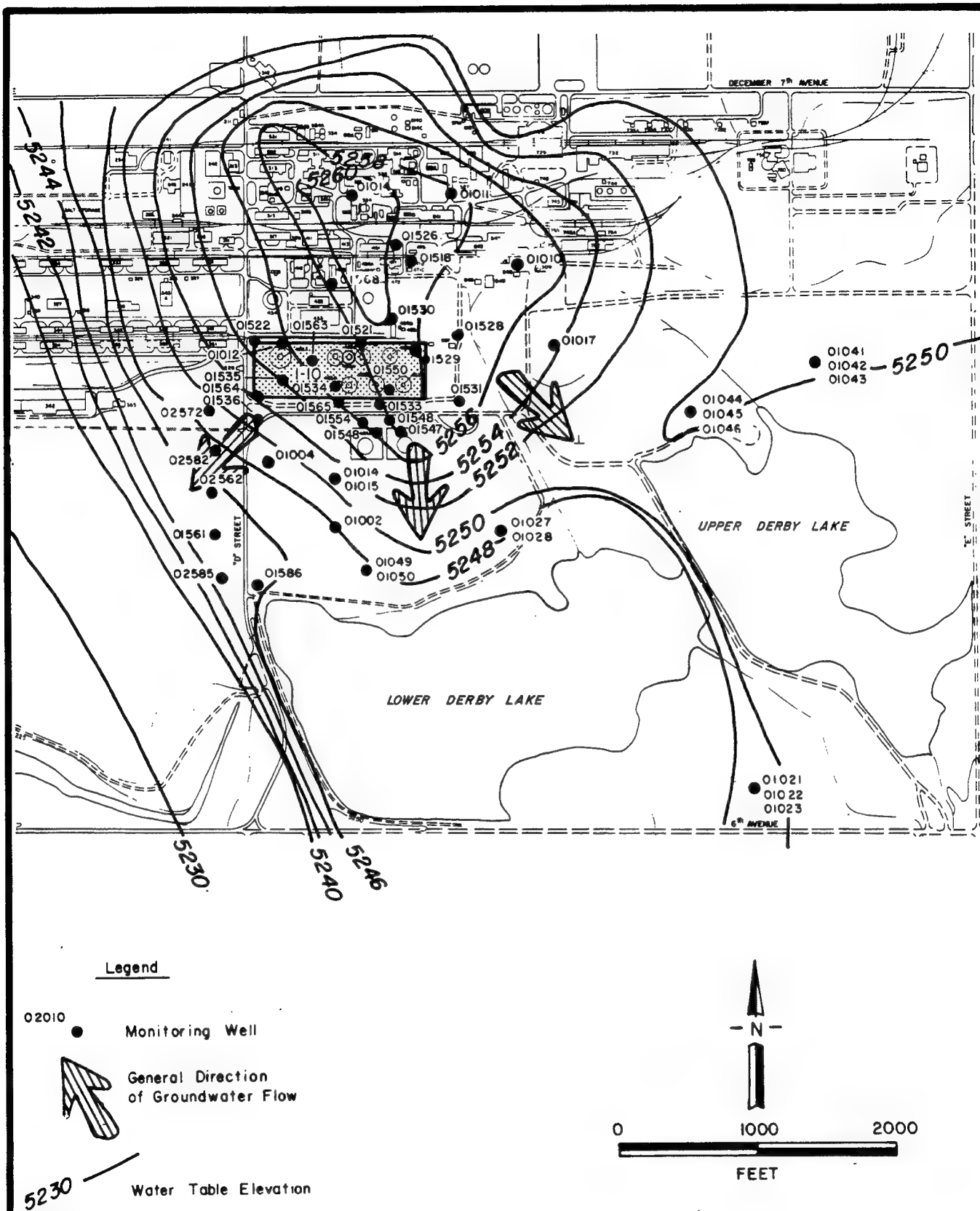
Program Manager's Office for  
Rocky Mountain Arsenal Cleanup  
Aberdeen Proving Ground, Maryland

Drafted : 3/16/87

#### FIGURE I-10-4

#### Topography and Surface Drainage

Rocky Mountain Arsenal, Task 2  
Prepared by: Ebasco Services Incorporated



Prepared for  
 Program Manager's Office for  
 Rocky Mountain Arsenal Cleanup  
 Aberdeen Proving Ground, Maryland

Drafted: 11/22/86

FIGURE 1-10-5  
 Water Table Elevations and Generalized  
 Groundwater Flow Direction  
 Rocky Mountain Arsenal, Task 2  
 Prepared by Ebasco Services Incorporated

dicyclopentadiene, dichlorobenzene, chloroform, benzene, toluene, and chlorobenzene, all of which were found in the upgradient wells, were found in Wells 01529, 01534, and 01535 (Silveira, 1981/RIC 83041R01). Downgradient from Site 1-10, Wells 01028 and 02562 (ESE, 1986b/RIC 86317R01; Silveira, 1981/RIC 83041R01) showed the presence of diisopropylmethyl phosphonate, chloroform, benzene, toluene, chlorobenzene, and tetrachloroethylene. Although these compounds were detected in wells within and downgradient from Site 1-10, because they are representative of the class of chemicals typically found in the groundwater beneath the South Plants manufacturing complex, their presence in the groundwater below and downgradient from the site does not imply that they entered the groundwater from the site.

## 2.0 HISTORY

Information on the history of the area defined as Site 1-10 was gathered through a review of aerial photographs and a search of the literature and of the Shell I, Shell II, and Juris computer databases. Based on a review of these data, Site 1-10 has been identified as the south tank farm, which has included eleven different revetted storage tank locations.

Aerial photographs taken between 1948 and 1982 revealed the following information pertinent to Site 1-10. These descriptions are reported interpretations taken from Stout and Abbott (1982/RIC 83368R01) unless otherwise noted.

<u>Photo Date</u>	<u>Site Description</u>
1948	Ten tanks are visible at Site 1-10; each tank is revetted with earth.
1955	No change is apparent at Site 1-10 since 1948.
1966	The revetment for Tank 462B is visible, but the tank has been removed. No other change is visible.

<u>Photo Date</u>	<u>Site Description</u>
1970	The revetment for former Tank 462B is barely visible. Tank 462B has not been replaced. No other change is visible.
1974	No change is apparent at Site 1-10 since 1970.
1976	Tank 463E has been removed (CAP, 1976).
1980	The revetment for Tank 463E is visible. The revetment for former Tank 462B is barely discernible; the area has revegetated.
1982	Tank 463D has been removed. A new tank and concrete pad are visible between Tanks 463A and 463B (CAP, 1982).

The south tank farm was constructed in 1942 as part of the initial construction of RMA (USAMC, 1973). Building 461, a one-story concrete and tile pumphouse, was built, and ten welded steel, vertical storage tanks (462A, 462B, and 463A-H), revetted by soil, were installed at the site. These tanks were set directly on the ground; undermining was a problem at times (Knaus, 1978).

The tanks were constructed of dismantled salvage material that was shipped to RMA. In reconstructing the tanks, it was necessary to trim each steel plate prior to welding the sheets together. Tank dimensions and capacities, once remeasured and recalibrated were as follows:

<u>Tank Number</u>	<u>Diameter (Feet)</u>	<u>Height (Feet)</u>	<u>Calibrated Capacity (Gallons)</u>
462A	46.2	34.3	408,562
462B	44.6	24.5	383,109
463A	35.6	26.5	189,776



<u>Tank Number</u>	<u>Diameter (Feet)</u>	<u>Height (Feet)</u>	<u>Calibrated Capacity (Gallons)</u>
463B	35.6	26.5	191,972
463C	33.8	29.2	196,274
463D	33.9	29.5	193,389
463E	34.0	29.2	192,525
463F	35.2	26.5	191,771
463G	34.9	26.5	188,696
463H	35.0	26.5	189,639

In late 1960, Tank 462B was removed from the tank farm. It was relocated in Section 2, north of Building 325, at the fuel oil storage site for the boiler house (Williams, 1960a). The tank was renumbered "321E" and used for fuel storage (Williams, 1960b).

Between 1975 and 1976, a tank was removed from the south tank farm to the hydrazine facility (Barbieri, 1986). The tank that is presently located at the hydrazine facility is identified as Tank 463D on the RMA Basic Information Maps (COE, 1984). This information agrees with Supplemental Agreement No. 23 to Shell Chemical Company's lease, which indicated that Tank 463D would be removed from Shell's lease as of August 15, 1975 (Unauthored, 1975). The tank was apparently returned to the Army at their request (Knaus, 1975).

The 1976 aerial photograph (CAP, 1976) shows that although the tank at the hydrazine facility is presently labeled 463D, the tank taken from Site 1-10 was taken from the position of Tank 463E shown in Figure 1-10-2, which is based on RMA engineering drawings (RMA, 1945b). A map used by Shell in 1979 also shows Tank 463D still present in the tank farm and Tank 463E missing (Unauthored, 1979).

A 1982 aerial photograph (CAP, 1982) of the area shows that the tank historically identified as 463D has been moved or removed from the site, and a tank appears in a new location between Tanks 463A and 463B. Anderson (1986) recalls seeing a crane in the south tank farm in 1980 or 1981 move a tank within the farm to a site between Tanks 463A and 463B. This tank was

placed on a concrete pad and appropriate containment features were installed. This tank has been identified as Tank 463E on the RMA Basic Information Maps (COE, 1984) and by field personnel at RMA.

According to Barbieri (1986), it is unlikely that if Tank 463E was moved by mistake to the hydrazine facility, it would have been brought back to the south tank farm and replaced by the historically identified Tank 463D. Apparently the tank numbers were changed at some unknown time. As the issue is undecided, discussions of the actual uses of Tanks 463D and 463E must incorporate the information available for both tanks.

The storage tanks located at Site 1-10 have held a variety of fluids. These tanks were initially used by the Army and then leased to Colorado Fuel and Iron (CF&I), Julius Hyman and Company, and Shell Chemical Company. The following summarizes the contents of these tanks:

<u>Tank</u>	<u>Description</u>
462A	Used for fuel oil storage by the Army (USAMC, 1973). Hyman and Shell both used the tank to store dicyclopentadiene. The tank was cleaned and an epoxy-coated bottom was installed in the late 1970s (Hahn, 1985). Inspections of the tank during the 1960s and 1970s indicated that the tank was pitted and was leaking (Helfer, 1967, 1969 a-c; Obel, 1969; Reed, 1975)
462B	Used for fuel oil storage by the Army, and by Shell for the storage of crude bicycloheptadiene bottoms. The tank was moved from the south tank farm in 1960 and renumbered 321E. It is now located west of Building 242 and north of Buildings 321 and 325.
463A	Used for alcohol storage by the Army. Both Hyman and Shell used the tank for storage of isopropyl alcohol and water for their endrin processes. The tank was later used to store spent sulfuric acid for the planavin plant.

<u>Tank</u>	<u>Description</u>
463B	Used for alcohol storage by the Army. Shell used the tank to store D-D soil fumigant (Knaus, 1973) and spent sulfuric acid.
463C	Used for alcohol, dicyclopentadiene (Knaus, 1973), and dichloropropene-dichloropropane storage (Shell, 1985).
463D	Used to store alcohol by the Army. Shell used it to store bicycloheptadiene bottoms and spent sulfuric acid. Tank 463D was removed from its historical location after 1980. It is not certain whether Tank 463D, now at the hydrazine facility, is in fact the historical tank.
463E	Used to store alcohol, bicycloheptadiene bottoms, sulfuric acid, and dibromochloropropane, successively. Old Tank 463E was removed from its historical location. It is uncertain whether the tank presently identified as 463E is in fact the old tank.
463F	Used to store alcohol and bicycloheptadiene bottoms, successively.
463G	Used to store alcohol, dicyclopentadiene bottoms, and sulfuric acid, successively.
463H	Used to store alcohol and then sulfuric acid.

Four pumps in Building 461 were used to unload liquids from tank cars and trucks located on the tracks and road north of the building (RMA, 1945). Two of the pumps were used for unloading fuel oil into Tanks 462A and 462B. Fuel oil from these tanks was pumped out and fed to a burner that provided energy for the electrical system of RMA (Justice, 1985). Bicycloheptadiene

and dicyclopentadiene bottoms were also used as fuel for the burners (Justice, 1985). The other two pumps in Building 461 were used to pump fluids from Tanks 463A through H. The piping of these tanks allowed the delivery of fluid from any tank and the transfer of fluids between tanks (RMA, 1945):

Because sediment accumulated in the bottom of the tanks, they periodically required cleaning (Bisted, 1985). When a tank was cleaned it was first emptied. Then a hole the size of a tractor was cut into the tank's side. A portable pump was then used to remove as much of the sediment as possible, and men with squeegees and shovels pushed the remaining sediment out of the hole. The sediment that was removed flowed into a pit adjacent to the tank and contained within its diked area (Knaus, 1985; Eck, 1985). The sediment was then buried. An unidentified Shell employee believed that in 1967 Tanks 463B, 463F, and 463G were cleaned out in a fashion similar to that described above (Unauthored, 1982). Dicyclopentadiene bottoms reportedly were removed from these tanks (Unauthored, 1982; Dreier, 1985).

Boyd (1985) and Knaus (1985) recalled a cleanup at the south tank farm in which contaminated soil was placed in 55 gallon drums and taken off RMA.

Six documented spills at Site 1-10, the south tank farm, are summarized in chronological order below.

<u>Date</u>	<u>Responsible Party</u>	<u>Description of Spill</u>
1948	CF&I	100,000 gallons (gal) of benzene spilled in the area. The specific location of the spill is unknown (Hahn, 1985; Denver Post, 1978; Kauffman, 1980).

<u>Date</u>	<u>Responsible Party</u>	<u>Description of Spill</u>
1963	Shell	17,000 gal of dicyclopentadiene were pumped onto the ground when a tank car ran over a hose (Shell, 1963).
August 8, 1976	Shell	1548 gal of dicyclopentadiene bottoms and No. 6 fuel oil spilled from a broken line between Tanks 463F and 463G (Hahn, 1985)
September 1978	Shell	50,864 gal of bicycloheptadiene and No. 6 fuel oil were lost from a broken line. (Hahn, 1985).
Mid to Late 1970s	Shell	A large spill of D-D soil fumigant occurred at the D-D unloading spot. The failure of a belly valve on a tank car caused the spill (Wedler, 1985).
Undated	Shell	Spent acid was spilled during the filtering of Tanks 463F and 463G. A hose hooked up to a potable water line was used to dilute and wash the acid into a ditch (Wedler, 1985).

### 3.0 SITE INVESTIGATION

#### 3.1 PREVIOUS SOIL INVESTIGATIONS

The regional soil type in the vicinity of RMA is of the Ascalon-Vona-Truckton Association. This association consists of loamy and sandy soils formed in wind-laid deposits on uplands that are somewhat excessively drained to well drained (Kolmer & Anderson, 1977/RIC 81295R07). Soil at Site 1-10 is a Truckton loamy sand with a 1 to 3 percent slope on the west and a 3 to 9 percent slope on the east (USDA, 1974).

In late 1979, Shell collected and analyzed soil samples from the south tank farm (Kauffman, 1980). Benzene was detected in the vicinity of Tank 463F at concentrations that ranged from 48 parts per million (ppm) to an excess of 89 ppm.

### 3.2 PHASE I SURVEY

#### 3.2.1 Phase I Program

Using the methodology in the Task 2 Technical Plan (Ebasco, 1985/RIC 87006R01) 13 borings, yielding 35 samples, were to be drilled to depths ranging from 5 to 15 ft at a boring density of 1/34,000 ft<sup>2</sup>.

A field reconnaissance of the site was performed to assess and stake the boring locations prior to drilling. A geophysical clearance of the Site 1-10 boring locations was conducted to ensure that drilling would not penetrate underground piping, although no unexploded ordnance or other buried objects were believed to be in the immediate vicinity of the site. Slight changes to boring locations were made as a result of this survey (Technos, 1985). The locations of Borings 5, 7, 8, 11, 12, and 13 were moved a few feet in order to avoid pipes. The locations of four other borings (1, 2, 3, and 10) were altered in order to ensure complete coverage of the site. Boring 1 was inadvertently drilled just south of the site boundary. All other borings (4, 6, and 9) were located at their originally planned locations. No changes to the site boundaries were made. Figure 1-10-2 shows the locations of the Phase I borings as they were actually drilled. The sampling program was altered because of an unexpectedly high water table and because of high volatile organics readings.

Thirteen borings, yielding 30 samples, were actually completed at Site 1-10 as follows:

<u>Boring No.</u>	<u>Depth (ft)</u>	<u>No. of Samples</u>
1	5	2
2	10	4
3	5	2

<u>Boring No.</u>	<u>Depth (ft)</u>	<u>No. of Samples</u>
4	5	2
5	5.5	3
6	5	3
7	5	2
8	5	2
9	5	2
10	5	2
11	5	2
12	5	2
13	5	2

All samples were analyzed by gas chromatography/mass spectrometry (GC/MS) for volatile organics (except the 0-1 ft interval) and semivolatile organics; by an inductively coupled argon plasma (ICP) screen for metals; and by separate analyses for dibromochloropropane, arsenic, and mercury. Appendix 1-10-A presents the specific target analytes for which laboratory analyses were conducted. A summary of the results of these analyses is presented in Table 1-10-1, Section 3.2.4, of this report.

### 3.2.2 Phase I Field Observations

Site 1-10 is a tank farm that currently contains eight tanks. Each tank, 462A, 463A, 463B, 463C, 463E, 463F, 463G, and 463H, has a soil or concrete berm around it. Each berm is approximately 2 ft thick and at a 10 ft distance from each tank. The area is flat, sparsely vegetated with grass, and surrounded by roads on all four sides.

To ensure safety, in-situ air monitoring was conducted during drilling operations using a photoionization detector (HNU) and an organic vapor analyzer (OVA). HNU readings significantly above background were recorded at Borings 1, 2, 4, 5, 6, and 11. OVA readings significantly above background were recorded at Borings 2 and 5. The results of the volatile organic readings down the borings at the sampled depths are presented in Table 1-10-2, Section 3.2.4, of this report.

Because of unusual air monitoring measurements and water levels in the soil, additional samples were taken at the 5.8 to 6.2 ft interval of Boring 2, the 5.0 to 5.1 ft interval of Boring 5, and the 3.6 to 3.8 ft interval of Boring 6.

An M8 alarm and M18A2 test kit were used to monitor for the presence of chemical agents in the borehole or soil samples per standard operating procedures. The M8 alarm is used specifically to detect sarin (GB) and VX at detection levels of 0.2 and 0.4 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) after a response time of 2 to 3 minutes (USAMDARC, 1979; USAMDARC, 1982). However, many other substances in addition to these two target compounds can cause the M8 alarm to respond, including smoke and engine exhaust. The M18A2 is used as a backup test if an M8 alarm is triggered, as a substitute for an M8, and as a specific check for the presence of mustard. The M18A2 detects G agents (including tabun, GA; sarin, GB; and soman, GD); V agents; all forms of mustard (mustard, H; distilled mustard, HD; thickened mustard, HT; nitrogen mustard, HN); cyanogen chloride, CK; phosgene oxime, CX; lewisite, L; ethyldichloroarsine, ED; and methyldichloroarsine, MD (HDOA, 1976). The detection limit for mustard agents is  $0.5 \text{ mg}/\text{m}^3$ ; the detection limit for GB is  $0.2 \text{ mg}/\text{m}^3$ .

The M8 alarm sounded at a depth of 10 ft during the drilling of Boring 2; however, the reading could not be verified by a second M8 or by the M18A2 test kit. No other indications of possible chemical agents were detected by these instruments. An M260 meter was used to detect oxygen concentrations and explosive levels. No significant deviations from background were noted. No unexploded ordnance, buried metal, or other buried objects were detected during drilling. No unusual coloring or staining of the core samples was noted.

### 3.2.3 Geophysical Exploration

Although boring locations were cleared for safety purposes using geophysical techniques to avoid buried pipelines, no geophysical exploration was conducted at Site 1-10, as no other buried objects were expected to be present.



#### 3.2.4 Phase I Analyte Levels and Distribution

Benzene, dicyclopentadiene, dieldrin, and methylene chloride were detected and copper, zinc, and mercury were found within or above indicator range in samples from Site 1-10. The number of samples containing each analyte; and the concentration range, median, mean, standard deviation, detection limit, and indicator level are listed in Table 1-10-1. The results of geologic field observations, air monitoring during drilling, and the chemical analysis of each soil sample are summarized in Table 1-10-2. The results of geologic field observations, air monitoring during drilling, and the chemical analysis of each soil sample are summarized in Table 1-10-2.

Indicator levels and ranges were established to assess the significance of metal and organic analytical values. The indicator level is the method detection limit for organic compounds. The indicator range for metals reflects the concentrations expected to occur naturally in RMA alluvial soils. Selection of these ranges is discussed in the Introduction to the Contamination Assessment Reports (ESE, 1986a).

The single occurrence of benzene was recorded at 7 micrograms per gram (ug/g) in the 9 to 10 ft interval of Boring 2. Boring 2 was the only boring drilled deeper than 5.5 ft, and the 9 to 10 ft interval was the only sample below the water table. Methylene chloride was reported in the 4 to 5 ft intervals of Borings 1, 2, and 3, all of which are located in the western portion of the site. The concentrations of methylene chloride ranged from 2 to 90 ug/g.

Dicyclopentadiene was detected by the volatile organic compound analytical method in Borings 4, 5, and 6 in the center of the site. It was found at a concentration of 200 ug/g in the 4 to 5 ft interval of Boring 4, where it was also detected by the semivolatile method, at 1 ug/g in the 5 to 5.1 ft interval of Boring 5, and at 4 ug/g in the 3.6 to 3.8 and 4 to 5 ft intervals of Boring 6. Dieldrin was detected at 2 ug/g in the surface (0-1 ft) interval of Boring 3, and at 20 ug/g in the surface interval of Boring 4.

Table 1-10-1. Analysis of Data on Chemical Constituents Detected During Phase I Field Study.

Constituent Detected	Number of Samples*	Range	Median**	Mean**	Standard Deviation**	Concentration (ug/g)		Indicator Level
						UBTL	CAL	
Volatiles (N=17)								
Benzene	1	7	-	-	-	0.3	0.3	DL *
Dicyclopentadiene	4	1-200	-	-	-	0.7	0.4	DL
Methylene chloride	3	2-90	-	-	-	2	0.7	DL
Semivolatiles (N=29)								
Dicyclopentadiene	2	0.7-100	-	-	-	1	0.4	DL
Dieldrin	2	2.0-20	-	-	-	0.3	0.3	DL
ICP Metals (N=30)								
Cadmium	0							
Chromium	17	8.4-15	12	12	2.4	0.74	0.66	1.0-2.0
Copper	27	6.1-50	11	13	8.7	6.5	5.2	25-40
Lead	10	11-18	14	15	2.2	4.7	4.9	20-35
Zinc	30	25-110	44	49	20	8.4	13	25-40
						8.7	9.5	60-80
Arsenic (N=30)								
None detected	0							
						2.5	5.0	DL-10
Mercury (N=30)								
	1	0.2	-	-	-	0.050	0.060	DL-0.10

\* - Number of samples in which constituent was detected

\*\* - Median, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples

Site 1-10  
3650A/1034A  
Rev. 3/2/87

Table 1-10-2. Results of Phase I Field Study.

Depth (feet) Geologic Material	Boring 1		Boring 2				Boring 3		Boring 4	
	0-1 Silt/ Silty Sand	4-5 Sand	0-1 Silty Sand	4-5 Sandy Clay/ Clay	5-8-6.2 Clay	9-10* Sandy Clay	0-1 Silty Sand	4-5 Clay	0-1 Silty Sand	4-5 Clay
Percent Fines	80-10	0	20	60	100	60	10	100	5	100
AIR MONITORING										
Volatile Organic Readings (ppm)										
HNU	BKD	1.8	0.2	0.1	NR	4.5-14.5**	BKD	0.8	BKD	249.4
OVA	0.1	3.3	NR	NR	3.8-48.8**	13.8**	BKD	1.3	NR	NR
SOIL CHEMISTRY										
Volatiles (ug/g)										
Benzene	NA	BDL	NA	BDL	BDL	7	NA	BDL	NA	BDL
Dicyclopentadiene	NA	BDL	NA	BDL	BDL	BDL	NA	BDL	NA	200
Methylene chloride	NA	2	NA	10	BDL	BDL	NA	90	NA	BDL
Semivolatiles (ug/g)										
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	100
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL	2	BDL	20	BDL
ICP Metals (ug/g)										
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	BDL	BDL	BDL	15	BDL	BDL	13	BDL	BDL	15
Copper	6.1	BDL	18	12	19	8.9	13	7.2	8.6	13
Lead	BDL	BDL	BDL	BDL	BDL	BDL	18	BDL	17	BDL
Zinc	34	27	64	54	63	86	47	33	38	55
Arsenic (ug/g)										
None detected										
Mercury (ug/g)										
	BDL	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

BKD - Background

NA - Volatiles not analyzed in 0-1 ft sample

NR - Not reported

\* - M8 alarm went off after auger removed

\*\* - Reading taken over cuttings rather than downhole

Site 1-10

3603A/1034A

Rev. 4/21/87

Table 1-10-2. Results of Phase I Field Study (Continued).

Depth (feet) Geologic Material Percent Fines	Boring 5			Boring 6		Boring 7	
	0-1 Sandy Clay	4-5 Clay	5-5.1 Clay	0-1 Silty Sand	3.6-3.8 Silty Clay	0-1 Sand	4-5 Clayey Sand
	60	100	100	40	90	0	5
AIR MONITORING							
<u>Volatile Organic Readings (ppm)</u>							
HNU	BKD	29-39	11-14	BKD	29.7*	0.9	1.0
OVA	0.1	58-68	NR	1.6	NR	NR	NR
SOIL CHEMISTRY							
<u>Volatiles (ug/g)</u>							
Benzene	NA	BDL	BDL	NA	BDL	NA	BDL
Dicyclopentadiene	NA	BDL	1	NA	4	NA	BDL
Methylene chloride	NA	BDL	BDL	NA	BDL	NA	BDL
<u>Semivolatiles (ug/g)</u>							
Dicyclopentadiene	BDL	BDL	NR	BDL	0.7	BDL	BDL
Dieldrin	BDL	BDL	NR	BDL	BDL	BDL	BDL
<u>ICP Metals (ug/g)</u>							
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	12	11	12	15	15	8.4	9.0
Copper	13	15	13	11	17	6.7	6.3
Lead	13	17	BDL	14	BDL	BDL	BDL
Zinc	44	81	88	42	48	38	36
<u>Arsenic (ug/g)</u>							
None detected							
<u>Mercury (ug/g)</u>							
	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

BKD - Background

NA - Volatiles not analyzed in 0-1 ft sample

NR - Not reported

\* - Reading taken over cuttings rather than downhole

Site 1-10  
3603A/1034A  
Rev. 4/21/87

Table 1-10-2. Results of Phase I Field Study (Continued).

Depth (feet) Geologic Material	Boring 8		Boring 9		Boring 10		Boring 11	
	0-1 Clayey Silty Sand 30	4-5 Clay 100	0-1 Sand 0	4-5 Sand 0	0-1 Silty Sand Silt 40	4-5 Sandy 60	0-1 Sandy Silt 90	4-5 Sand 0
Percent Fines								
AIR MONITORING								
<u>Volatile Organic Readings (ppm)</u>								
HNU	BKD	0.5	BKD	0.3	0.6	1.0	0.4	5.6-12
OVA	NR	NR	BKD	NR	NR	NR	NR	NR
SOIL CHEMISTRY								
<u>Volatiles (ug/g)</u>								
Benzene	NA	BDL	NA	BDL	NA	BDL	NA	BDL
Dicyclopentadiene	NA	BDL	NA	BDL	NA	BDL	NA	BDL
Methylene chloride	NA	BDL	NA	BDL	NA	BDL	NA	BDL
<u>Semivolatiles (ug/g)</u>								
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<u>ICP Metals (ug/g)</u>								
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	8.9	BDL	9.7	BDL	12	BDL	12	10
Copper	8.1	14	7.8	BDL	7.2	23	8.5	6.7
Lead	11	BDL	BDL	BDL	BDL	BDL	14	14
Zinc	38	49	31	26	45	60	50	44
<u>Arsenic (ug/g)</u>								
None detected								
<u>Mercury (ug/g)</u>								
	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

BKD - Background

NA - Volatiles not analyzed in 0-1 ft sample

NR - Not reported

Site 1-10  
3603A/1034A  
Rev. 4/21/87

Table 1-10-2. Results of Phase I Field Study (Continued).

Depth (feet) Geologic Material	Boring 12		Boring 13	
	0-1 Clayey Silty Sand 10	4-5 Sand 0	0-1 Sand 0	4-5 Claystone 100
Percent Fines				
AIR MONITORING				
<u>Volatile Organic Readings (ppm)</u>				
HNU	0.1	0.3-0.5	0.1	0.3
OWA	NR	NR	NR	NR
SOIL CHEMISTRY				
<u>Volatiles (ug/g)</u>				
Benzene	NA	BDL	NA	BDL
Dicyclopentadiene	NA	BDL	NA	BDL
Methylene Chloride	NA	BDL	NA	BDL
<u>Semivolatiles (ug/g)</u>				
Dicyclopentadiene	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	BDL
<u>ICP Metals (ug/g)</u>				
Cadmium	BDL	BDL	BDL	BDL
Chromium	15	BDL	BDL	BDL
Copper	8.0	7.6	BDL	50
Lead	13	BDL	BDL	16
Zinc	34	29	25	110
<u>Arsenic (ug/g)</u>				
None detected				
<u>Mercury (ug/g)</u>				
	BDL	BDL	BDL	BDL

BDL - Below detection limit

NA - Volatiles not analyzed in 0-1 ft sample

NR - Not reported

Site 1-10  
3603A/1034A  
Rev. 4/21/87

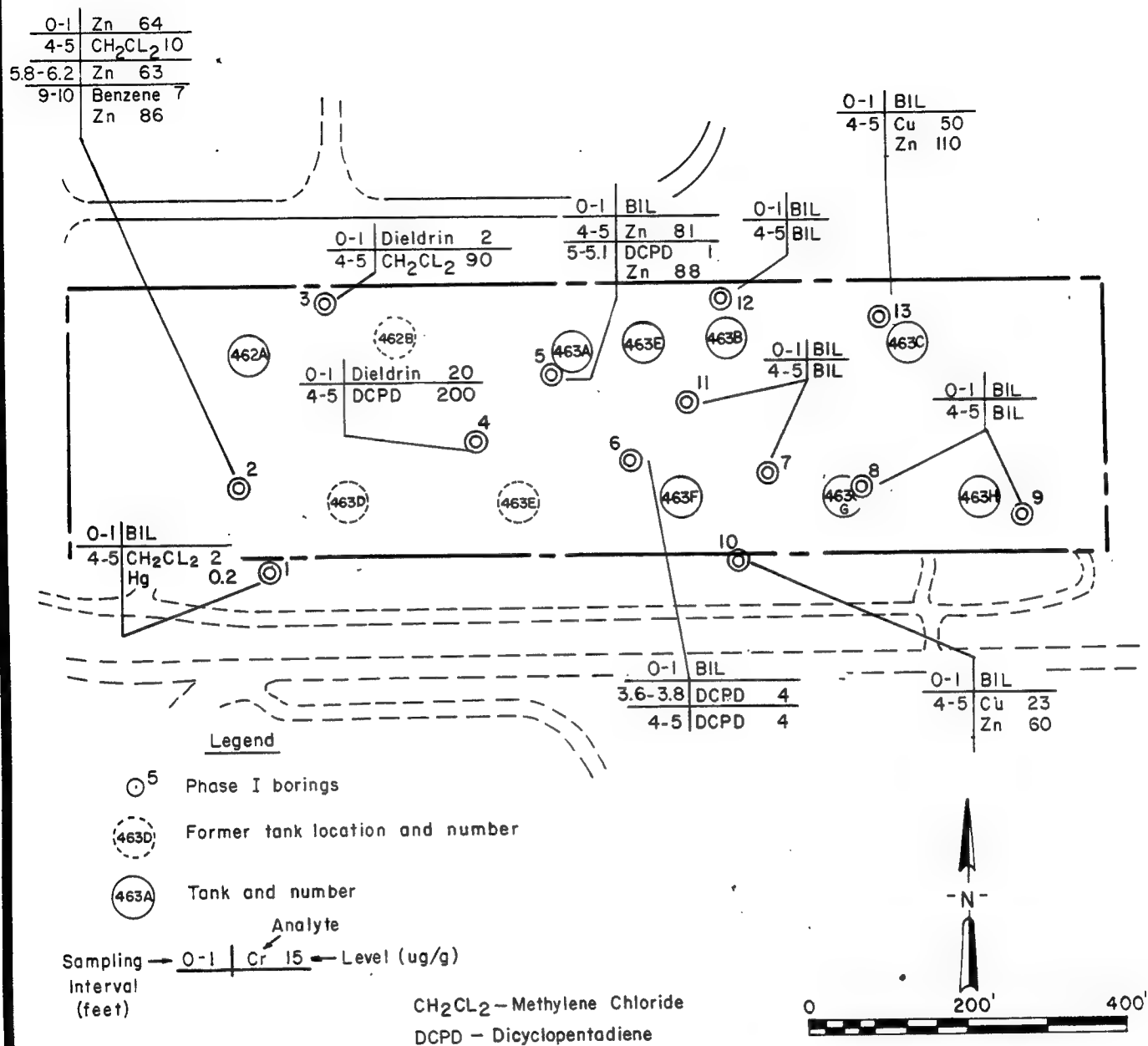
Metals detected within or above their respective indicator ranges in samples from Site 1-10 were copper, zinc, and mercury. The amounts detected appear to be uniformly distributed both laterally and vertically throughout the site. Mercury was detected at 0.2 ug/g in the 4 to 5 ft interval of Boring 1. Copper and zinc were within or above their indicator ranges in samples from Borings 2, 5, 10, and 13. The distribution of analytes detected within or above their indicator ranges at Site 1-10 in the Phase I program is presented in Figure 1-10-6. A tabulation of all analytical data associated with the Phase I program is presented in Appendix 1-10-B.

In addition, several compounds were detected by GC/MS that were not conclusively identified. Table 1-10-3 lists the boring number, sample interval depth, relative retention time (shown as "unknown number" on the table), concentration, sample number, lot, best-fit identification, and comments for these nontarget compounds. It should be noted that an individual compound may have more than one retention time, and also that a particular retention time may be assigned to more than one compound. Therefore, Table 1-10-3 provides only a general indication of additional compounds that may be present. In the nontarget fraction, 1,1,2,2-tetrachlorethane was tentatively identified in Boring 12 (at the 0-1 ft interval), and a benzene was tentatively identified in Boring 4 (4-5 ft interval). Low concentrations of chlorinated unknowns were also found in Boring 4 (0-1 ft interval).

### 3.2.5 Phase I Contamination Assessment

Phase I samples from Site 1-10 had detectable levels of benzene, dicyclopentadiene, methylene chloride, and dieldrin, and concentrations of copper, zinc, and mercury within or above indicator range.

Benzene was detected in the single soil sample from the water table at Site 1-10, and may be a reflection of the benzene found in the groundwater underlying the site. Although there was a benzene spill reported in the south tank farm area, there was no indication of this compound in the near-surface soils. Detected dicyclopentadiene concentrations were clustered in the



### Prepared for:

Program Manager's Office for  
Rocky Mountain Arsenal Cleanup  
Aberdeen Proving Ground, Maryland

### FIGURE 1-10-6

Analytes Detected Within or Above  
Indicator Levels

Rocky Mountain Arsenal, Task 2

Prepared by: Ebasco Services Incorporated



**Table 1-10-3. Tentative Identification of Nontarget Compounds.**

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
1	0-1			003	AAN		K
	4-5	094	0.2	007	AAO	2-pentanone	possibly associated w/gasoline
		127	0.1	007	AAO	a dimethyl cyclohexane	possibly associated w/gasoline
		134	0.4	007	AAO	ethylcyclohexane	possibly associated w/gasoline
		140	0.1	007	AAO		A
		160	0.4	007	AAO	octane	possibly associated w/gasoline
		136	0.2	007	AAO	a trimethyl 2-pentene	possibly associated w/gasoline
				004	AAN		K
2	0-1			007	AAN		K
	4-5			009	AAO		K
				008	AAN		K
	5.8-6.2	133	1.8	002	ABO	ethylcyclohexane	
		159	1.6	002	ABO	C-9 alkane	K
				001	ABS		
	8.9-9.8			010	AAO		K
				009	AAN		K
3	0-1			005	AAN		K
	4-5			008	AAO		K
				006	AAN		K
4	0-1	545	0.3	002	ABS	3A,4,7,7A-tetrahydro-4,7-methano-1H-indene	P, possibly a coal tar or petroleum derived product
		579	0.6	002	ABS	hexadecanoic acid	A
		609	0.3	002	ABS	unknown with 6 chlorines	D
		629	0.2	002	ABS	alcohol GT C-17	A
		634	0.2	002	ABS	unknown with 6 chlorines	D
		640	0.8	002	ABS	unknown with 6 chlorines	A
		641	0.3	002	ABS	unknown with 6 chlorines	A
		643	0.5	002	ABS	unknown with 6 chlorines	A
		614	0.2	002	ABS		A

A - No positive identification  
D - Derived from natural products  
F - Low concentration  
GT - Greater than  
K - None detected  
\* - Values reported are blank corrected

Site 1-10  
4238A/1064A  
Rev. 3/27/87

Table 1-10-3. Tentative Identification of Nontarget Compounds (Continued).

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
4	4-5	146	30	003	ABO	C <sub>3</sub> H <sub>5</sub> -benzene	A
		539	12	003	ABS	3A,4,7,7A-tetrahydro-4,7-methano-1H-indene	possibly a coal tar or petroleum derived product
		543	4.0	003	ABS	related to UNK #543	A
		563	30	003	ABS	spectrum related to UNK #543	A
		564	15	003	ABS	isomer of UNK #564	A
		566	50	003	ABS		A
		569	7.0	003	ABS		A
		573	7.0	003	ABS		A
		578	4.0	003	ABS		A
		581	9.0	003	ABS		A
		582	30	003	ABS	isomer of UNK #581	A
		583	6.1	003	ABS	isomer of UNK #583	A
		584	10	003	ABS		A
		585	12	003	ABS		A
		586	4.0	003	ABS		A
		587	6.0	003	ABS		A
5	0-1			004	ABS		K
		133	1.4	004	ABO	ethylcyclohexane	
		160	1.1	004	ABO	C-9 alkane	K
				005	ABS		
		160	1.3	005	ABO	C-9 alkane	K
				006	ABS		
				007	ABS		K
		160	1.1	007	ABO	C-9 alkane	K
				009	ABS		
		160	1.5	006	ABO	C-9 alkane	K
6	0-1			008	ABS		K
				004	ABZ	C-17 alcohol	D
		634	0.5				
7	0-1						

A - No positive identification  
 D - Derived from natural products  
 K - None detected  
 UNK - Unknown  
 \* - Values reported are blank corrected

Site 1-10  
 4238A/1064A  
 Rev. 3/27/87

Table 1-10-3. Tentative Identification of Nontarget Compounds (Continued).

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
7	4-5			003 005	ABR ABZ		K K
8	0-1			008	ABZ		K
	4-5			005 009	ABR ABZ		K K
9	0-1			010	ABZ		K
	4-5	125	3.0	006 011	ABR ABZ	2,2,4-trimethylpentane	K
10	0-1	610 619	0.5 0.6	006 006	ABZ ABZ	hexadecanoic acid C-16 alkene	D
	4-5			004 007	ABR ABZ		K K
11	0-1			010	ABS		K
	4-5	133 160 635	1.7 1.4 0.2	008 008 011	ABO ABO ABS	ethylcyclohexane C-9 alkane alcohol GT C-17	D
12	0-1	531 535	1.4 1.0	002 002	ABZ ABZ	1,1,2,2-tetrachloroethane a trichloro 1-propene	
	4-5			002 003	ABR ABZ		K K
13	0-1	529 609 636	0.2 0.2 0.3	012 012 012	ABZ ABZ ABZ	hexadecanoic acid C-18 aldehyde	A D
	4-5			007 013	ABR ABZ		K K

A - No positive identification  
D - Derived from natural products  
GT - Greater than  
K - None detected  
\* - Values reported are blank corrected

Site 1-10  
4238A/1064A  
Rev. 3/27/87

vicinity of Borings 4, 5, and 6. Historical data indicate that tanks in this vicinity (Tanks 463A and 463F) were used to store alcohol; Tank 463F was also used to store bicycloheptadiene but not dicyclopentadiene. Tanks 462A, 463C, and 463G were used to store dicyclopentadiene at some time in their recorded usage. There is no apparent correlation between the distribution of dicyclopentadiene concentrations detected during Phase I and the locations of these tanks. The distribution of methylene chloride was limited to the western portion of the site. The two locations at which dieldrin was detected (Borings 3 and 4) were adjacent to each other in the western portion of the site, in the surface samples from the same borings.

The distribution of metals detected across the site showed no discernible pattern. The single concentration of copper and the concentrations of zinc that exceeded indicator range were all associated with clay or claystone and are within the normal range of these metals in western soils. The only detected concentration of mercury (Boring 1) was above its indicator range and will be investigated further in the Phase II program.

The semivolatile method, although not certified for volatile compounds, has been shown to be capable of detecting tetrachloroethylene, toluene, chlorobenzene, ethylbenzene, and xylenes in the nontarget fraction. The absence of these compounds in the nontarget results for this site is an indication that there is no contamination present from these compounds.

### 3.3 PHASE II SURVEY

Based on the results of the Phase I program, a Phase II program is proposed to further assess:

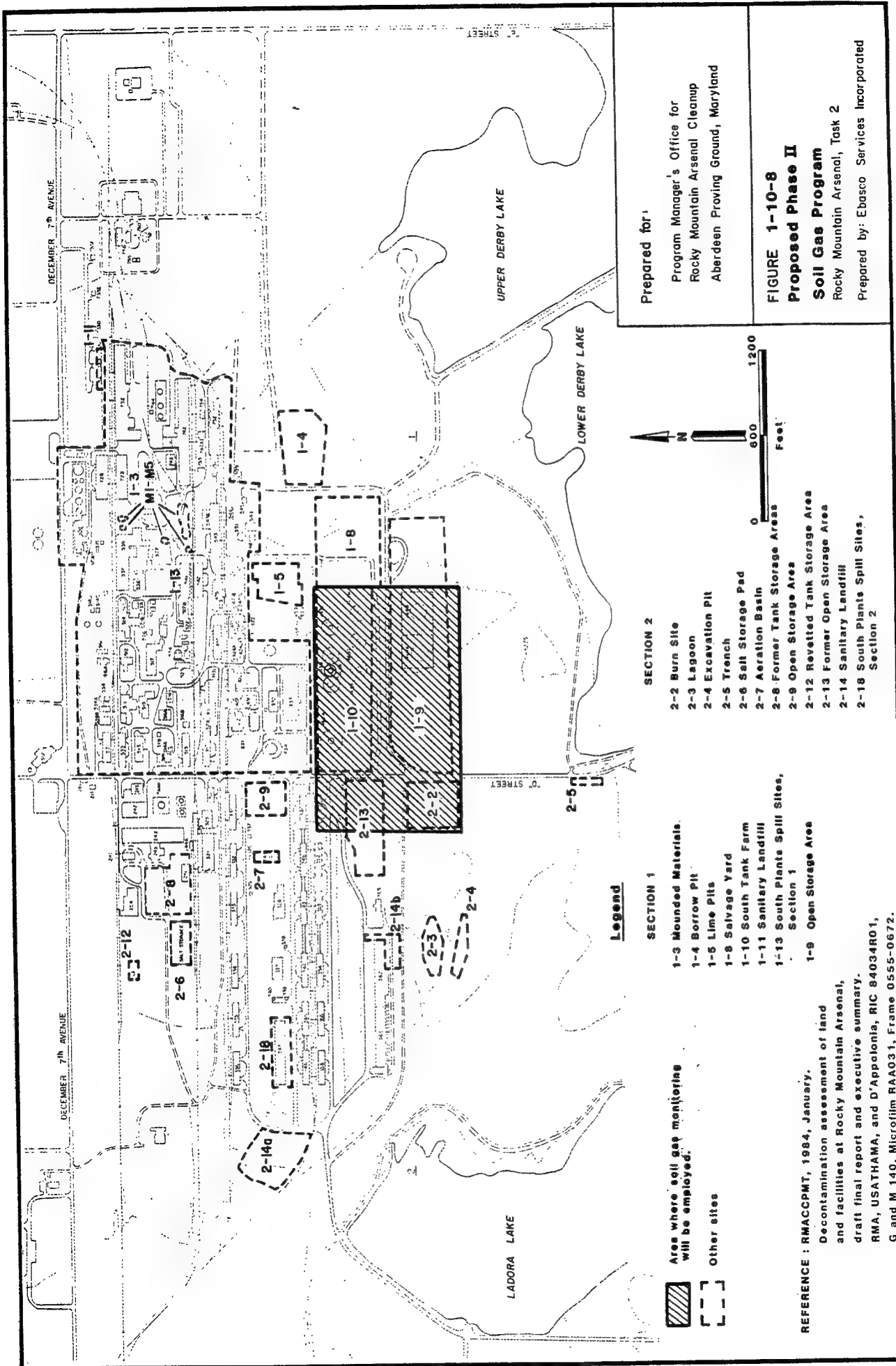
- o The vertical and horizontal extent of methylene chloride in the vicinity of Borings 1, 2, and 3;
- o The horizontal extent of dieldrin in the vicinity of Borings 3 and 4;

- o The vertical and horizontal extent of mercury in the vicinity of Boring 1;
- o The vertical and horizontal extent of dicyclopentadiene in the vicinity of Borings 4, 5, and 6;
- o Whether organochlorine pesticides, methylisobutyl ketone, and mercury extend into the northeast corner of Site 1-10 from Site 1-8;
- o Whether potential contaminants have leaked from the tanks onto adjacent areas; and
- o Whether the benzene concentrations detected in soils in or near the saturated zone at this site are the result of groundwater contamination.

To satisfy the first five objectives listed above, a boring program will be undertaken during Phase II. Hand-augered samples will also be taken to assess whether potential contaminants have leaked from the tanks. These eleven samples will be hand-augered where drill rig access is difficult. They will be taken to 5 ft below the surface inside the dike and adjacent to each tank or former tank location in Site 1-10. This part of the Phase II program will be drilled and sampled as shown in Figure 1-10-7.

The last objective will be addressed with a Phase II soil gas program that is proposed for Site 1-10 and portions of Sites 1-9, 2-13, and 2-2 (Figure 1-10-8). This program will assess the presence of a possible benzene plume in the groundwater beneath these sites to explain the presence of the benzene detected in Boring 2 of Site 1-10 and of benzene near the water table in other sites. Soil gas survey points will be placed at 50 ft grid spacings. The grid will be adjusted locally to avoid cultural features such as roads, buildings, and pipelines. An estimated 700 soil gas survey points will be placed.





Prepared for:

Program Manager's Office for  
Rocky Mountain Arsenal Cleanup  
Aberdeen Proving Ground, Maryland

**FIGURE 1-10-8  
Proposed Phase II  
Soil Gas Program**

Rocky Mountain Arsenal, Task 2

Prepared by: Ebasco Services Incorporated

The number of borings and samples to be taken at specific depths during Phase II are tabulated below.

<u>No. of Borings</u>	<u>Depth (ft)</u>	<u>No. of Samples</u>
11 (hand-auger)	5	22
7	8	24
4	10	14

The number of samples to be tested by each analytical method is listed below:

<u>Analytical Method</u>	<u>No. of Samples</u>
Organochlorine pesticides (OCP)	11
Dicyclopentadiene (DCPD, volatile method)	9
Purgeable organohalogen (POH)	24
Mercury (Hg)	15
Volatile organics (VO)	11
Semivolatile organics (SVO)	22
Methylisobutyl ketone (MIBK)	3

<u>Soil Gas Survey</u>	<u>No. of Samples</u>
Benzene	700
Ethylbenzene	700
Toluene	700
Xylenes	700

The draft final version of this report and the proposed Phase II program have been reviewed in an on-post MOA meeting of January 14, 1987. Comments were received from the Colorado Department of Health on November 21, 1986, and from Shell Chemical Company on November 17, 1986. These comments were considered in the preparation of this final report. EPA comments are an integral part of the report review process, and previously have been incorporated into this report. Comments and responses are provided in Appendix 1-10-C.



### 3.4 QUANTITY OF POTENTIALLY CONTAMINATED SOIL

The originally calculated estimate of the extent of potentially contaminated soil (RMAGCPMT, 1984/RIC 84034R01) was:

Estimated Areal Extent = 473,600 ft<sup>2</sup>;

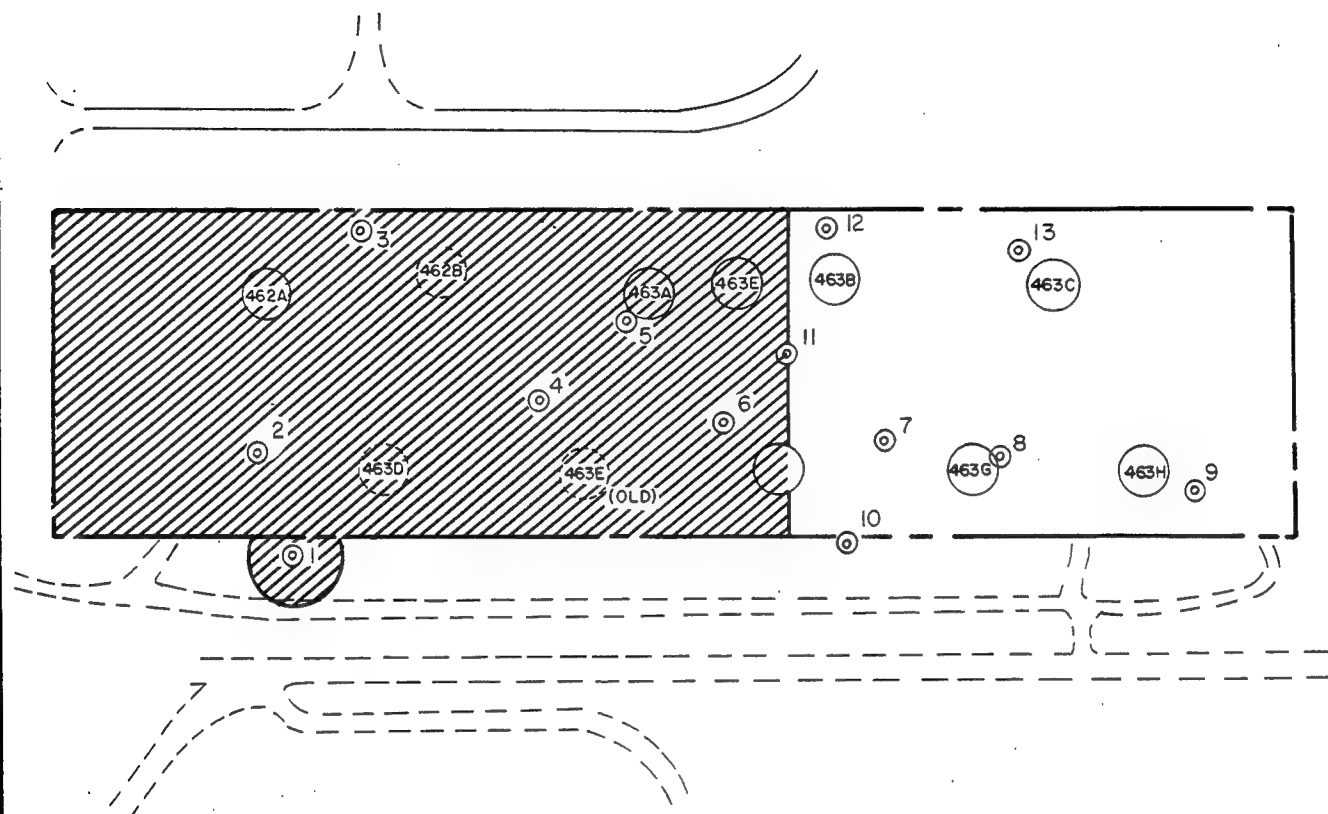
Estimated Vertical Extent = 10 ft; and

Estimated Volume = 175,000 cubic yards (yd<sup>3</sup>).




As a result of Phase I analyses, the estimated volume of potentially contaminated soil has been revised to 74,000 yd<sup>3</sup> based on the following data. The 9 to 10 ft interval of Boring 2 is the deepest interval sampled during Phase I, and it contained detectable levels of benzene. However, groundwater was reached at 7.5 ft in the same boring. The benzene is considered to be associated with a groundwater plume and its extent will be investigated in the Phase II program.

Dicyclopentadiene and methylene chloride were detected in the 4 to 5 ft intervals of Borings 1, 2, 3, 4, 5, and 6. The area encompassing these borings is bounded by the site boundaries on the north, south, and west and by a north-south line passing through Boring 11 on the east. The area of this portion of the site is 261,800 ft<sup>2</sup>. In addition, a circle with a radius of 50 ft around Boring 1 is assumed to be potentially contaminated (Figure 1-10-9). The area of the part of the circle beyond the site boundary is 5333 ft<sup>2</sup> measured by planimeter, giving a total area of 267,133 ft<sup>2</sup>. This area is considered to be potentially contaminated to a depth of 7.5 ft, the depth to the water table. Therefore, the total estimated volume of potentially contaminated soil is 74,000 yd<sup>3</sup>.

Results from the Phase I survey were used to generate a most conservative (worst-case) estimate of the volume of potentially contaminated soil at Site 1-10. This delineation of the boundaries of potential contamination should not be construed to indicate the actual presence of contamination within the volumes outlined. In addition, this approach is not intended to imply that any or all of the soil within the potentially contaminated volume must be



#### Legend

- ⊙ 1 Phase I borings
-  Area of Potentially Contaminated Soil (0-7.5 ft.)
-  Relocated tank and number
-  Tank and number



0 200 400  
FEET

#### Prepared for:

Program Manager's Office for  
Rocky Mountain Arsenal Cleanup  
Aberdeen Proving Ground, Maryland

Drafted : 2/28/87

#### FIGURE I-10-9

#### Quantity of Potentially Contaminated Soil

Rocky Mountain Arsenal, Task 2

Prepared by: Ebasco Services Incorporated

remediated, nor does it make any assumption about the type of remediation that may be required. Rather, this approach is intended to provide preliminary estimates of the maximum possible volume of contaminated materials for planning purposes only.

The estimated volume of potentially contaminated soil will be refined further after the results of the Phase II program are obtained.

R. L. St

th R. L.

Computer

Compute

photogr

ocky Mo  
neer Di

t of 40

: Compu

chnica  
-84-D-  
senal

ion to  
am Man

port,  
senal

omput

ectio

THIS  
PAGE  
IS  
MISSING  
IN  
ORIGINAL  
DOCUMENT

HDOA (Headquarters-Department of the Army). 1976. Technical manual, detector kit, chemical agent, ABC-M18A2. TM3-6665-254-12.

Helfer, M.G. 1967, June 19. Inspection report titled, acetylene tank farm. Shell Chemical Company, Microfilm RSH925, Frames 1013-1013.

Helfer, M.G.: 1969, January 22. Inspection report - Tank 462A. Shell Chemical Company, Microfilm RSH925, Frame 1012.

Helfer, M.G. 1969, July 15. Inspection report - Tank 462A. Shell Chemical Company, Microfilm RSH925, Frames 1009-1010.

Helfer, M.G. 1969, August 7. Inspection report - Tank 462A. Shell Chemical Company, Microfilm RSH925, Frame 1008.

HDOA (Headquarters-Department of the Army). 1976. Technical manual, detector kit, chemical agent, ABC-M18A2. TM3-6665-254-12.

Justice, K.L. 1985, June 19. Juris deposition, v. 1. Juris Computer Database.

Kauffman, G.W. 1980a, March 24. Water Analysis - Denver Plant leasehold wells. Shell Chemical Company. Microfilm RSH815, Frames 2048-2049.

Kauffman, G.W. 1980b, September 10. Soil samples - south tank farm - Denver chemical plant. Shell Chemical Company. Microfilm RSH912, Frames 0979-0983.

Knaus, J.H. 1973, July 27. Air contaminant emission notice. Microfilm RSH925, Frames 1765-1768.

Knaus, J.H. 1975, September 10. Letter from Shell to Histerek requesting that Tank 463D be released from its lease. Microfilm RSH928, Frames 1753-1753.

Knaus, J.H. 1978, March 31. Letter from Shell discussing the renovation of the south tank farm. Microfilm RSH867, Frames 1676-1693.

Knaus, J.H. 1985, October 15. Juris deposition, v. 3. Juris Computer Database.

RIC 81295R07

Kolmer, J.R., and G.A. Anderson. 1977. Installation restoration of RMA, part I - pilot containment operations final environmental impact statements. Microfilm RMA065, Frames 0484-0485.

RIC 82295R01

May, J.H. 1982. Regional groundwater study of Rocky Mountain Arsenal, Colorado: Report #1, hydrogeological definition. USAEWES. Microfilm RMA040, Frames 1851-1931.

RIC 83299R01

May, J.H., J.K. Crabtree, R.W. Hunt, and W.L. Murphy. 1983, September. Hydrogeology of Basin A/South Plants Area, Rocky Mountain Arsenal, Denver, Colorado, phase I. USAEWES. Microfilm RVA001, Frames 1132-1297.

Obel, J.A. 1969, October 24. Inspection report - Tank 462A. Shell Chemical Company. Microfilm RSH925, Frame 1007.

Reed, R.A. 1975, August 14. Inspection report - Tank 462. Shell Chemical Company. Microfilm RSH925, Frame 1004.

RIC 82096R01

Resource Consultants, Inc. 1982, March. Surface water hydrologic analyses. Rocky Mountain Arsenal. USATHAMA.

RMA. 1945a, August 15. History of Rocky Mountain Arsenal - 1945, part VII, production operations, Section 6, H manufacturing plant. Microfilm RSA009, Frames 1058-1077.

RMA. 1945b. Engineering drawings D-675A and D-673.

RIC 84034R01

RMACCPMT. 1984. Decontamination assessment of land and facilities at Rocky Mountain Arsenal, draft final report and executive summary. RMA, USATHAMA, and D'Appolonia.

Shell (Shell Chemical Company). 1963, September. Cyclo unit operations, Denver Plant. Microfilm RSH928, Frames 0575-0576.

Shell, 1985. Shell's response to Army Interrogatory #3. Department of Justice.

RIC 83041R01

Silveira, E.J. 1981. Analysis of Denver water samples. Shell Technical Progress Report No. M-9-81.

RIC 84100R01

Spaine, P.A., and R. Gregg. 1983. Surface water quality study of the South Plants Area.

RIC 83368R01

Stout, K. and L. Abbott. 1982, October. Installation assessment, Rocky Mountain Arsenal, v. I and II. Bionetics Corporation, EPA, USATHAMA. Microfilm RAA020, Frames 1451-1498, 1578-1701.

Technos (Technos Inc.). 1985. Geophysical investigation at the South Plants area of Rocky Mountain Arsenal, Denver, Colorado. Prepared for EnviroSphere Company and USATHAMA. Ebasco No. 32523.

Unauthored. 1975. Supplemental agreement No. 23 to Lease No. W025-075-ENG-7886. Shell Chemical Company lease with Army. Microfilm RSH931, Frames 0794-0803.

Unauthored. 1979. Map titled, south tank farm, benzene, ppm. Microfilm RSH808, Frames 0437-0437.

Unauthored. 1982. Past landfill activity. Microfilm REX001, Frames 0055-0075.

USAMC (U.S. Army Materiel Command). 1973. Army Materiel Command contamination survey, Rocky Mountain Arsenal. Microfilm RMA031, Frames 1312-1392.

USAMDARC (U.S. Army Materiel Development and Readiness Command). 1979. Safety regulations for chemical agent H. DARCOM-R 385-31. Department of the Army.

USAMDARC. 1982. Safety regulations for chemical agents GB and VX. DARCOM-R 385-102. Department of the Army.

USDA (United States Department of Agriculture). 1974, October. Soil survey of Adams County, Colorado. Soil Conservation Service.

Wedler, E.H. 1986, April 29. Juris deposition, v. 1. Juris Computer Database.

Williams, O.M. 1960a, November 14. Letter from Shell discussing the reassignment of Tank 462B. Microfilm RSH934, Frame 0705.

Williams, O.M. 1960b, December 2. Letter from Shell discussing the installation of Tank 462B. Microfilm RNA009, Frames 0703-0704.

## **Appendix 1-10-A**

### **Chemical Names and Abbreviations**



APPENDIX 1-10-A  
Chemical Names and Abbreviations

<u>Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<b>Volatile Organics</b>		
1,1-Dichloroethane	1,1-Dichloroethane	11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Benzene	Benzene	C6H6
Bicycloheptadiene	Bicycloheptadiene	BCHPD
Carbon tetrachloride	Carbon Tetrachloride	CCL4
Chlorobenzene	Chlorobenzene	CLC6H5
Chloroform	Chloroform	CHCL3
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dimethyldisulfide	Dimethyldisulfide	DMDS
Ethylbenzene	Ethylbenzene	ETC6H5
m-Xylene	m-Xylene	13DMB
Methylene chloride	Methylene Chloride	CH2CL2
Methylisobutyl ketone	Methylisobutyl Ketone	MIBK
o- and p-Xylene	Ortho- & Para-Xylene	XYLEN
Tetrachloroethylene	Tetrachloroethene	TCLEE
Toluene	Toluene	MEC6H5
trans-1,2-Dichloroethylene	Trans-1,2-Dichloroethene	T12DCE
Trichloroethylene	Trichloroethene	TRCLE
<b>Semivolatile Organics</b>		
1,4-Oxathiane	1,4-Oxathiane	OXAT
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	PPDDE
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	PPDDT
Aldrin	Aldrin	ALDRN
Atrazine	Atrazine	ATZ
Chlordane	Chlordane	CLDAN
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CPMS
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMSO2
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dieldrin	Dieldrin	DLDRN
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DIMP
Dimethylmethyl phosphonate	Dimethylmethyl phosphate	DMMP
Dithiane	Dithiane	DITH

# APPENDIX 1-10-A (Continued)

<u>Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<b>Semivolatile Organics (Continued)</b>		
Endrin	Endrin	ENDRN
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	CL6CP
Isodrin	Isodrin	ISODR
Malathion	Malathion	MLTHN
Parathion	Parathion	PRTHN
Supona	2-Chloro-1 (2,4-Dichlorophenyl) vinyl diethyl Phosphates	SUPONA
Vapona	Vapona	DDVP
<b>ICP Metals Screen</b>		
Cadmium	Cadmium	CD
Chromium	Chromium	CR
Copper	Copper	CU
Lead	Lead	PB
Zinc	Zinc	ZN
<b>Separate Analyses</b>		
Dibromochloropropane	Dibromochloropropane	DBCP
Arsenic	Arsenic	AS
Mercury	Mercury	HG

## **Appendix 1-10-B**

### **Phase I Chemical Data**

APPENDIX 1-10-B  
Phase I Chemical Data

The analytical results of the laboratory analysis of soil samples collected as part of the Phase I program comprise the first part of Appendix 1-10-B. Data are listed sequentially by boring number and successive depths below the surface. Within each depth, all analytes for which the samples were tested are listed alphabetically. Results are given as less than (LT) the detection limit for the test laboratory, or as detected concentrations above this limit. Based on the accuracy of laboratory test methods, values for volatile and semivolatile compounds are considered accurate to one significant figure, values for dibromochloropropane when tested separately and for metals are considered accurate to two significant figures.

The second part of Appendix 1-10-B contains data from the blanks associated with Phase I analytical work. Blanks for Phase I soil samples were based on a homogenized subsample of composited samples from a known uncontaminated soil that is stratigraphically similar to the RMA soils. Blanks for Phase I water samples were based on distilled water. Control samples, or blanks, are introduced into the train of environmental samples to function as monitors on the performance of the analytical method. These samples function as quality control (QC) samples, and are an integral part of the quality assurance (QA) program for the project. The method blanks listed in this Appendix were utilized to verify that the laboratory was not a source of sample contamination. If contamination were detected in a method blank, corrective actions were taken to assure that reported concentrations of target analytes reflected sample analytes, and not analytes introduced by the laboratory process.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0001	0-1	Soil	Aldrin	LT 3. -01	ug/g	AAND03
			Arsenic	LT 5.0 +00	ug/g	AAV006
			Atrazine	LT 3. -01	ug/g	AAND03
			Cadmium	LT 7.4 -01	ug/g	ABD011
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	AAND03
			Chlordane	LT 6. -01	ug/g	AAND03
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	AAND03
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	AAND03
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	AAND03
			Chromium	LT 6.5 +00	ug/g	ABD011
			Copper	6.1 +00	ug/g	ABD011
			Dibromochloropropane	LT 3. -01	ug/g	AAND03
			Dicyclopentadiene	LT 4. -01	ug/g	AAND03
			Vapona	LT 3. -01	ug/g	AAND03
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	AAND03
			Dithiane	LT 7. +00	ug/g	AAND03
			Dieldrin	LT 3. -01	ug/g	AAND03
			Endrin	LT 3. -01	ug/g	AAND03
			Mercury	LT 5.0 -02	ug/g	AAI014
			Isodrin	LT 3. -01	ug/g	AAND03
0001	4-5	Soil	Malathion	LT 3. -01	ug/g	AAND03
			1,4-Oxathiane	LT 6. +00	ug/g	AAND03
			Lead	LT 8.4 +00	ug/g	ABD011
			Dichlorodiphenylethane	LT 3. -01	ug/g	AAND03
			Dichlorodiphenyltrichloro-ethane	LT 6. -01	ug/g	AAND03
			Parathion	LT 4. -01	ug/g	AAND03
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 3. -01	ug/g	AAND03
			Zinc	3.4 +01	ug/g	ABD011
			1,1,1-Trichloroethane	LT 3. -01	ug/g	AAO007
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AAO007
			1,1-Dichloroethane	LT 9. -01	ug/g	AAO007
			1,2-Dichloroethane	LT 3. -01	ug/g	AAO007

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

Ebasco Services Incorporated  
Summary of Analytical Results

Rocky Mountain Arsenal Program  
Task 2, Site 1-10 South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0006	0-1	Soil	Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABS007
			Chlordane	LT 6. -01	ug/g	ABS007
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABS007
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABS007
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABS007
			Chromium	1.5 +01	ug/g	ABG009
			Copper	1.1 +01	ug/g	ABG009
			Dibromochloropropane	LT 3. -01	ug/g	ABS007
			Dicyclopentadiene	LT 4. -01	ug/g	ABS007
			Vapona	LT 3. -01	ug/g	ABS007
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABS007
			Dithiane	LT 7. +00	ug/g	ABS007
			Dieldrin	LT 3. -01	ug/g	ABS007
			Endrin	LT 3. -01	ug/g	ABJ009
			Mercury	LT 5.0 -02	ug/g	ABS007
			Isodrin	LT 3. -01	ug/g	ABS007
			Malathion	LT 3. -01	ug/g	ABS007
			1,4-Oxathiane	LT 6. +00	ug/g	ABG009
			Lead	LT 1.4 +01	ug/g	ABS007
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABS007
0006	3.6-3.8	Soil	Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABS007
			Parathion	LT 4. -01	ug/g	ABS007
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABS007
			Zinc	4.2 +01	ug/g	ABG009
			1,1,1-Trichloroethane	LT 3. -01	ug/g	AB0007
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AB0007
			1,1-Dichloroethane	LT 9. -01	ug/g	AB0007
			1,2-Dichloroethane	LT 3. -01	ug/g	AB0007
			m-Xylene	LT 7. -01	ug/g	AB0007
			Aldrin	LT 3. -01	ug/g	ABS009
			Arsenic	LT 5.0 +00	ug/g	ABK011
			Atrazine	LT 3. -01	ug/g	ABS009

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

Isodrin  
Teluene

2.0 -01 ug/g AAID15

LT 3. -01 ug/g AAN004

LT 3. -01 ug/g AAC007

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0001	4-5	Soil	1,4-Oxathiane	LT 6. +00	ug/g	AAN004
			Lead	LT 8.4 +00	ug/g	ABD012
			Dichlorodiphenylethane	LT 3. -01	ug/g	AAN004
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	AAN004
			Parathion	LT 4. -01	ug/g	AAN004
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	AAN004
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AA0007
			Tetrachloroethene	LT 3. -01	ug/g	AA0007
			Trichloroethene	LT 3. -01	ug/g	AA0007
			Ortho- & Para-Xylene	LT 3. -01	ug/g	AA0007
0002	0-1	Soil	Zinc	2.7 +01	ug/g	ABD012
			Aldrin	LT 3. -01	ug/g	AAN007
			Arsenic	LT 5.0 +00	ug/g	AAV013
			Atrazine	LT 3. -01	ug/g	AAN007
			Cadmium	LT 7.4 -01	ug/g	ABD015
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	AAN007
			Chlordane	LT 6. -01	ug/g	AAN007
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	AAN007
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	AAN007
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	AAN007
			Chromium	LT 6.5 +00	ug/g	ABD015
			Copper	1.8 +01	ug/g	ABD015
			Dibromochloropropane	LT 3. -01	ug/g	AAN007
			Dicyclopentadiene	LT 4. -01	ug/g	AAN007
			Vapona	LT 3. -01	ug/g	AAN007
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	AAN007
			Dithiane	LT 7. +00	ug/g	AAN007
			Dieldrin	LT 3. -01	ug/g	AAN007
			Endrin	LT 3. -01	ug/g	AAN007
			Mercury	LT 5.0 -02	ug/g	AAI018
			Isodrin	LT 3. -01	ug/g	AAN007

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

12/19/86

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 2, Site 1-10 South Tank Farm

## Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0002	0-1	Soil	Malathion	LT 3. -01	ug/g	AAND07
			1,4-Oxathiane	LT 6. +00	ug/g	AAND07
			Lead	LT 8.4 +00	ug/g	ABD015
			Dichlorodiphenylethane	LT 3. -01	ug/g	AAND07
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	AAND07
			Parathion	LT 4. -01	ug/g	AAND07
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	AAND07
			Zinc	6.4 +01	ug/g	ABD015
			1,1,1-Trichloroethane	LT 3. -01	ug/g	AA0009
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AA0009
0002	4-5	Soil	1,1-Dichloroethane	LT 9. -01	ug/g	AA0009
			1,2-Dichloroethane	LT 3. -01	ug/g	AA0009
			m-Xylene	LT 7. -01	ug/g	AA0009
			Aldrin	LT 3. -01	ug/g	AAND08
			Arsenic	LT 5.0 +00	ug/g	AAV014
			Atrazine	LT 3. -01	ug/g	AAND08
			Bicycloheptadiene	LT 3. -01	ug/g	AA0009
			Benzene	LT 3. -01	ug/g	AA0009
			Carbon Tetrachloride	LT 3. -01	ug/g	AA0009
			Cadmium	LT 7.4 -01	ug/g	ABD016
			Methylene Chloride	1. +01	ug/g	AA0009
			Chloroform	LT 3. -01	ug/g	AA0009
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	AAND08
			Chlorobenzene	LT 3. -01	ug/g	AA0009
			Chlordane	LT 6. -01	ug/g	AAND08
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	AAND08
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	AAND08
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	AAND08
			Chromium	1.5 +01	ug/g	ABD016
			Copper	1.2 +01	ug/g	ABD016
			Dibromochloropropane	LT 3. -01	ug/g	AAND08
			Dibromochloropropane	LT 4. -01	ug/g	AA0009

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.



## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0002	4-5	Soil	Dicyclopentadiene	LT 4.	-01	AAN008
			Dicyclopentadiene	LT 3.	-01	AA0009
			Vapona	LT 3.	-01	AAN008
			Diisopropylmethyl Phosphonate	LT 3.	-01	AAN008
			Dithiane	LT 7.	+00	AAN008
			Dieldrin	LT 3.	-01	AAN008
			Dimethyldisulfide	LT 3.	-01	AA0009
			Endrin	LT 3.	-01	AAN008
			Ethylbenzene	LT 3.	-01	AA0009
			Mercury	LT 5.0	-02	AA1019
			Isodrin	LT 3.	-01	AAN008
			Toluene	LT 3.	-01	AA0009
			Methylisobutyl Ketone	LT 3.	-01	AA0009
			Malethion	LT 3.	-01	AAN008
			1,4-Oxathiane	LT 6.	+00	AAN008
			Lead	LT 8.4	+00	AB0016
			Dichlorodiphenylethane	LT 3.	-01	AAN008
			Dichlorodiphenyltrichloroethane	LT 6.	-01	AAN008
			Parathion	LT 4.	-01	AAN008
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3.	-01	AAN008
			Trans-1,2-Dichloroethene	LT 3.	-01	AA0009
			Tetrachloroethene	LT 3.	-01	AA0009
			Trichloroethene	LT 3.	-01	AA0009
			Ortho- & Para-Xylene	LT 3.	-01	AA0009
			Zinc	5.4	+01	AB0016
0002	5.8-6.2	Soil	1,1,1-Trichloroethane	LT 3.	-01	AB0002
			1,1,2-Trichloroethane	LT 3.	-01	AB0002
			1,1-Dichloroethane	LT 9.	-01	AB0002
			1,2-Dichloroethane	LT 3.	-01	AB0002
			m-Xylene	LT 7.	-01	AB0002
			Aldrin	LT 3.	-01	AB0001

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0002	5.8-6.2	Soil	Arsenic	LT 5.0 +00	ug/g	ABK005
			Atrazine	LT 3. -01	ug/g	ABS001
			Bicycloheptadiene	LT 3. -01	ug/g	AB0002
			Benzene	LT 3. -01	ug/g	AB0002
			Carbon Tetrachloride	LT 3. -01	ug/g	AB0002
			Cadmium	LT 7.4 -01	ug/g	ABG005
			Methylene Chloride	LT 7. -01	ug/g	AB0002
			Chloroform	LT 3. -01	ug/g	AB0002
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABS001
			Chlorobenzene	LT 3. -01	ug/g	AB0002
			Chlordane	LT 6. -01	ug/g	ABS001
			p-Chlorophenylmethyl Sulfide	LT 4. +01	ug/g	ABS001
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABS001
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABS001
			Chromium	LT 6.5 +00	ug/g	ABG005
			Copper	1.9 +01	ug/g	ABG005
			Dibromochloropropane	LT 4. -01	ug/g	AB0002
			Dibromochloropropane	LT 3. -01	ug/g	ABS001
			Dicyclopentadiene	LT 3. -01	ug/g	AB0002
			Dicyclopentadiene	LT 4. -01	ug/g	ABS001
			Vapona	LT 3. -01	ug/g	ABS001
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABS001
			Dithiane	LT 7. +00	ug/g	ABS001
			Dieldrin	LT 3. -01	ug/g	ABS001
			Dimethyldisulfide	LT 8. -01	ug/g	AB0002
			Endrin	LT 3. -01	ug/g	ABS001
			Ethylbenzene	LT 3. -01	ug/g	AB0002
			Mercury	LT 5.0 -02	ug/g	ABJ005
			Isodrin	LT 3. -01	ug/g	ABS001
			Toluene	LT 3. -01	ug/g	AB0002
			Methylisobutyl Ketone	LT 3. -01	ug/g	AB0002
			Malathion	LT 3. -01	ug/g	ABS001
			1,4-Oxathiane	LT 6. +00	ug/g	ABS001
			Lead	LT 8.4 +00	ug/g	ABG005

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2 , Site 1-10 South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0002	5.8-6.2	Soil	Dichlorodiphenylethane	LT 3. -01	ug/g	ABS001.
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABS001
			Parathion			
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 4. -01	ug/g	ABS001
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	ABS001
			Tetrachloroethene	LT 3. -01	ug/g	AB0002
			Trichloroethene	LT 3. -01	ug/g	AB0002
			Ortho- & Para-Xylene	LT 3. -01	ug/g	AB0002
			Zinc	6.3 +01	ug/g	AB0005
0002	9-10	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	AA0010
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AA0010
			1,1-Dichloroethane	LT 9. -01	ug/g	AA0010
			1,2-Dichloroethane	LT 3. -01	ug/g	AA0010
			m-Xylene	LT 7. -01	ug/g	AA0010
			Aldrin	LT 3. -01	ug/g	AAND09
			Arsenic	LT 5.0 +00	ug/g	AAVD15
			Atrazine	LT 3. -01	ug/g	AAND09
			Bicycloheptadiene	LT 3. -01	ug/g	AA0010
			Benzene	7. +00	ug/g	AA0010
			Carbon Tetrachloride	LT 3. -01	ug/g	AA0010
			Cadmium	LT 7.4 -01	ug/g	ABD017
			Methylene Chloride	LT 7. -01	ug/g	AA0010
			Chloroform	LT 3. -01	ug/g	AA0010
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	AAND09
			Chlorobenzene	LT 3. -01	ug/g	AA0010
			Chlordane	LT 6. -01	ug/g	AAND09
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	AAND09
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	AAND09
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	AAND09
			Chromium	LT 6.5 +00	ug/g	ABD017
			Copper	8.9 +00	ug/g	ABD017
			Dibromochloropropane	LT 3. -01	ug/g	AAND09

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

Rocky Mountain Arsenal Program  
Task 2 . Site 1-10      South Tank Farm

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0002	9-10	Soil	Dibromochloropropane	LT 4. -01	ug/g	AA0010
			Dicyclopentadiene	LT 4. -01	ug/g	AAN009
			Dicyclopentadiene	LT 3. -01	ug/g	AA0010
			Vapona	LT 3. -01	ug/g	AAN009
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	AAN009
			Dithiane	LT 7. +00	ug/g	AAN009
			Dieldrin	LT 3. -01	ug/g	AAN009
			Dimethyldisulfide	LT 3. -01	ug/g	AA0010
			Endrin	LT 3. -01	ug/g	AAN009
			Ethylbenzene	LT 3. -01	ug/g	AA0010
			Mercury	LT 5.0 -02	ug/g	AAI020
			Isodrin	LT 3. -01	ug/g	AAN009
			Toluene	LT 3. -01	ug/g	AA0010
			Methylisobutyl Ketone	LT 3. -01	ug/g	AA0010
			Malathion	LT 3. -01	ug/g	AAN009
			1,4-Oxathiane	LT 6. +00	ug/g	AAN009
			Lead	LT 8.4 +00	ug/g	ABD017
			Dichlorodiphenylethane	LT 3. -01	ug/g	AAN009
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	AAN009
0003	0-1	Soil	Parathion	LT 4. -01	ug/g	AAN009
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	AAN009
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AA0010
			Tetrachloroethene	LT 3. -01	ug/g	AA0010
			Trichloroethene	LT 3. -01	ug/g	AA0010
			Ortho- & Para-Xylene	LT 3. -01	ug/g	AA0010
			Zinc	8.6 +01	ug/g	ABD017
			Aldrin	LT 3. -01	ug/g	AAN005
			Arsenic	LT 5.0 +00	ug/g	AAVD11
			Atrazine	LT 3. -01	ug/g	AAN005
			Cadmium	LT 7.4 -01	ug/g	ABD013
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	AAN005

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0003	0-1	Soil	Chlordane	LT 6.	-01	AAN003
			p-Chlorophenylmethyl Sulfide	LT 4.	+00	AAN005
			p-Chlorophenylmethyl Sulfoxide	LT 7.	+00	AAN005
			p-Chlorophenylmethyl Sulfone	LT 6.	-01	AAN005
			Chromium	1.3	+01	ABD013
			Copper	1.3	+01	ABD013
			Dibromochloropropane	LT 3.	-01	AAN005
			Dicyclopentadiene	LT 4.	-01	AAN005
			Vapona	LT 3.	-01	AAN005
			Diisopropylmethyl Phosphonate	LT 3.	-01	AAN005
			Dithiane	LT 7.	+00	AAN005
			Dieldrin	2.	+00	AAN005
			Endrin	LT 3.	-01	AAN005
			Mercury	LT 5.0	-02	AAI016
			Isodrin	LT 3.	-01	AAN005
			Malathion	LT 3.	-01	AAN005
			1,4-Oxathiane	LT 6.	+00	AAN005
			Lead	1.8	+01	ABD013
			Dichlorodiphenylethane	LT 3.	-01	AAN005
			Dichlorodiphenyltrichloroethane	LT 6.	-01	AAN005
0003	4-5	Soil	Parathion	LT 4.	-01	AAN005
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3.	-01	AAN005
			Zinc	4.7	+01	ABD013
			1,1,1-Trichloroethane	LT 3.	-01	AA0008
			1,1,2-Trichloroethane	LT 3.	-01	AA0008
			1,1-Dichloroethane	LT 9.	-01	AA0008
			1,2-Dichloroethane	LT 3.	-01	AA0008
			m-Xylene	LT 7.	-01	AA0008
			Aldrin	LT 3.	-01	AAN006
			Arsenic	LT 5.0	+00	AAV012
			Atrazine	LT 3.	-01	AAN006
			Bicycloheptadiene	LT 3.	-01	AA0008

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0003	4-5	Soil	Benzene	LT 3. -01	ug/g	AA0008
			Carbon Tetrachloride	LT 3. -01	ug/g	AA0008
			Cadmium	LT 7.4 -01	ug/g	ABD014
			Methylene Chloride	9. +01	ug/g	AA0008
			Chloroform	LT 3. -01	ug/g	AA0008
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	AA0006
			Chlorobenzene	LT 3. -01	ug/g	AA0008
			Chlordane	LT 6. -01	ug/g	AA0006
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	AA0006
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	AA0006
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	AA0006
			Chromium	LT 6.5 +00	ug/g	ABD014
			Copper	7.2 +00	ug/g	ABD014
			Dibromochloropropane	LT 3. -01	ug/g	AA0006
			Dibromochloropropane	LT 4. -01	ug/g	AA0008
			Dicyclopentadiene	LT 4. -01	ug/g	AA0006
			Dicyclopentadiene	LT 3. -01	ug/g	AA0008
			Vapona	LT 3. -01	ug/g	AA0006
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	AA0006
			Dithiane	LT 7. +00	ug/g	AA0006
			Dieldrin	LT 3. -01	ug/g	AA0006
			Dimethyldisulfide	LT 3. -01	ug/g	AA0008
			Endrin	LT 3. -01	ug/g	AA0006
			Ethylbenzene	LT 3. -01	ug/g	AA0008
			Mercury	LT 5.0 -02	ug/g	AAI017
			Isodrin	LT 3. -01	ug/g	AA0006
			Toluene	LT 3. -01	ug/g	AA0008
			Methylisobutyl Ketone	LT 3. -01	ug/g	AA0008
			Malathion	LT 3. -01	ug/g	AA0006
			1,4-Oxathiane	LT 6. +00	ug/g	AA0006
			Lead	LT 8.4 +00	ug/g	ABD014
			Dichlorodiphenylethane	LT 3. -01	ug/g	AA0006
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	AA0006

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10 South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0003	4-5	Soil	Parathion	LT 4. -01	ug/g	AAN006
			2-Chloro-1(2,4-Dichlorophenyl)	LT 3. -01	ug/g	AAN006
			Vinylidieethyl Phosphates			
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AA0008
			Tetrachloroethene	LT 3. -01	ug/g	AA0008
			Trichloroethene	LT 3. -01	ug/g	AA0008
0004	0-1	Soil	Ortho- & Para-Xylene	LT 3. -01	ug/g	AA0008
			Zinc	3.3 +01	ug/g	ABD014
			Aldrin	LT 3. -01	ug/g	ABS002
			Arsenic	LT 5.0 +00	ug/g	AAW009
			Atrazine	LT 3. -01	ug/g	ABS002
			Cadmium	LT 7.4 -01	ug/g	ABE009
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABS002
			Chlordane	LT 6. -01	ug/g	ABS002
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABS002
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABS002
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABS002
			Chromium	LT 6.5 +00	ug/g	ABE009
			Copper	8.6 +00	ug/g	ABE009
			Dibromochloropropane	LT 3. -01	ug/g	ABS002
			Dicyclopentadiene	LT 4. -01	ug/g	ABS002
			Vapona	LT 3. -01	ug/g	ABS002
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABS002
			Dithiane	LT 7. +00	ug/g	ABS002
			Diieldrin	2. +01	ug/g	ABS002
			Endrin	LT 3. -01	ug/g	ABS002
			Mercury	LT 5.0 -02	ug/g	AAL005
			Isodrin	LT 3. -01	ug/g	ABS002
			Malathion	LT 3. -01	ug/g	ABS002
			1,4-Oxathiane	LT 6. +00	ug/g	ABS002
			Lead	1.7 +01	ug/g	ABE009
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABS002
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABS002

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 2, Site 1-10 South Tank Farm

## Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0004	0-1	Soil	Parathion	LT 4. -01	ug/g	ABS002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	ABS002
			Zinc	3.8 +01	ug/g	ABE009
0004	4-5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	AB0003
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AB0003
			1,1-Dichloroethane	LT 9. -01	ug/g	AB0003
			1,2-Dichloroethane	LT 3. -01	ug/g	AB0003
			m-Xylene	LT 7. -01	ug/g	AB0003
			Aldrin	LT 3. +00	ug/g	ABS003
			Arsenic	LT 5.0 +00	ug/g	AAW010
			Atrazine	LT 3. +00	ug/g	ABS003
			Bicycloheptadiene	LT 3. -01	ug/g	AB0003
			Benzene	LT 3. -01	ug/g	AB0003
			Carbon Tetrachloride	LT 3. -01	ug/g	AB0003
			Cadmium	LT 7.4 -01	ug/g	ABE010
			Methylene Chloride	LT 7. -01	ug/g	AB0003
			Chloroform	LT 3. -01	ug/g	AB0003
			Hexachlorocyclopentadiene	LT 3. +00	ug/g	ABS003
			Chlorobenzene	LT 3. -01	ug/g	AB0003
			Chlordane	LT 6. +00	ug/g	ABS003
			p-Chlorophenylmethyl Sulfide	LT 4. +01	ug/g	ABS003
			p-Chlorophenylmethyl Sulfoxide	LT 7. +01	ug/g	ABS003
			p-Chlorophenylmethyl Sulfone	LT 6. +00	ug/g	ABS003
			Chromium	1.5 +01	ug/g	ABE010
			Copper	1.3 +01	ug/g	ABE010
			Dibromochloropropane	LT 4. -01	ug/g	AB0003
			Dibromochloropropane	LT 3. +00	ug/g	ABS003
			Dicyclopentadiene	2. +02	ug/g	AB0003
			Dicyclopentadiene	1. +02	ug/g	ABS003
			Vapona	LT 3. +00	ug/g	ABS003
			Diisopropylmethyl Phosphonate	LT 3. +00	ug/g	ABS003
			Dithiane	LT 7. +01	ug/g	ABS003
			Dieldrin	LT 3. +00	ug/g	ABS003

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.



## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0004	4-5	Soil	Dimethyldisulfide	LT 8.	-01	AB0003*
			Endrin	LT 3.	+00	ABS003
			Ethylbenzene	LT 3.	-01	AB0003
			Mercury	LT 5.0	-02	AAL006
			Isodrin	LT 3.	+00	ABS003
			Toluene	LT 3.	-01	AB0003
			Methylisobutyl Ketone	LT 3.	-01	AB0003
			Malathion	LT 3.	+00	ABS003
			1,4-Oxathiane	LT 6.	+01	ABS003
			Lead	LT 8.4	+00	ABED10
			Dichlorodiphenylethane	LT 3.	+00	ABS003
			Dichlorodiphenyltrichloroethane	LT 6.	+00	ABS003
			Parathion	LT 3.	+00	ABS003
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3.	+00	ABS003
			Trans-1,2-Dichloroethene	LT 3.	-01	AB0003
			Tetrachloroethene	LT 3.	-01	AB0003
0005	0-1	Soil	Trichloroethene	LT 3.	-01	AB0003
			Ortho- & Para-Xylene	LT 3.	-01	AB0003
			Zinc	5.5	+01	ABED10
			Aldrin	LT 3.	-01	ABS004
			Arsenic	LT 5.0	+00	ABK006
			Atrazine	LT 3.	-01	ABS004
			Cadmium	LT 7.4	-01	ABG006
			Hexachlorocyclopentadiene	LT 3.	-01	ABS004
			Chlordane	LT 6.	-01	ABS004
			p-Chlorophenylmethyl Sulfide	LT 4.	+00	ABS004
			p-Chlorophenylmethyl Sulfoxide	LT 7.	+00	ABS004
			p-Chlorophenylmethyl Sulfone	LT 6.	-01	ABS004
			Chromium	1.2	+01	ABG006
			Copper	1.3	+01	ABG006
			Dibromochloropropane	LT 3.	-01	ABS004
			Dicyclopentadiene	LT 4.	-01	ABS004

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0005	0-1	Soil	Vapona	LT 3. -01	ug/g	ABS0004
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABS0004
			Dithiane	LT 7. +00	ug/g	ABS0004
			Dieldrin	LT 3. -01	ug/g	ABS0004
			Endrin	LT 3. -01	ug/g	ABS0004
			Mercury	LT 5.0 -02	ug/g	ABJ0006
			Isodrin	LT 3. -01	ug/g	ABS0004
			Malathion	LT 3. -01	ug/g	ABS0004
			1,4-Oxathiane	LT 6. +00	ug/g	ABS0004
			Lead	1.3 +01	ug/g	ABG0006
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABS0004
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABS0004
			Parathion	LT 4. -01	ug/g	ABS0004
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	ABS0004
			Zinc	4.4 +01	ug/g	ABG0006
0005	4-5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	AB00004
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AB00004
			1,1-Dichloroethane	LT 9. -01	ug/g	AB00004
			1,2-Dichloroethane	LT 3. -01	ug/g	AB00004
			m-Xylene	LT 7. -01	ug/g	AB00004
			Aldrin	LT 3. -01	ug/g	ABS0005
			Arsenic	LT 5.0 +00	ug/g	ABK0007
			Atrazine	LT 3. -01	ug/g	ABS0005
			Bicycloheptadiene	LT 3. -01	ug/g	AB00004
			Benzene	LT 3. -01	ug/g	AB00004
			Carbon Tetrachloride	LT 3. -01	ug/g	AB00004
			Cadmium	LT 7.4 -01	ug/g	ABG0007
			Methylene Chloride	LT 7. -01	ug/g	AB00004
			Chloroform	LT 3. -01	ug/g	AB00004
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABS0005
			Chlorobenzene	LT 3. -01	ug/g	AB00004

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2 , Site 1-10 South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0005	4-5	Soil	Chlordane	LT 6. -01	ug/g	ABS005
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABS005
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABS005
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABS005
			Chromium	1.1 +01	ug/g	ABG007
			Copper	1.5 +01	ug/g	ABG007
			Dibromochloropropane	LT 4. -01	ug/g	AB0004
			Dibromochloropropane	LT 3. -01	ug/g	AB0005
			Dicyclopentadiene	LT 3. -01	ug/g	AB0004
			Dicyclopentadiene	LT 4. -01	ug/g	AB0005
			Vapona	LT 3. -01	ug/g	AB0005
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	AB0005
			Dithiane	LT 7. +00	ug/g	AB0005
			Dieldrin	LT 3. -01	ug/g	AB0005
			Dimethyldisulfide	LT 8. -01	ug/g	AB0004
			Endrin	LT 3. -01	ug/g	AB0005
			Ethylbenzene	LT 3. -01	ug/g	AB0004
			Mercury	LT 5.0 -02	ug/g	ABJ007
			Isodrin	LT 3. -01	ug/g	AB0005
			Toluene	LT 3. -01	ug/g	AB0004
			Methylisobutyl Ketone	LT 3. -01	ug/g	AB0004
			Malathion	LT 3. -01	ug/g	AB0005
			1,4-Oxathiane	LT 6. +00	ug/g	AB0005
			Lead	1.7 +01	ug/g	ABG007
			Dichlorodiphenylethane	LT 3. -01	ug/g	AB0005
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	AB0005
			Parathion	LT 4. -01	ug/g	AB0005
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 3. -01	ug/g	AB0005
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AB0004
			Tetrachloroethene	LT 3. -01	ug/g	AB0004
			Trichloroethene	LT 3. -01	ug/g	AB0004
			Ortho- & Para-Xylene	LT 3. -01	ug/g	AB0004

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 2, Site 1-10 South Tank Farm

## Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0005	4-5	Soil	Zinc	8.1 +01	ug/g	ABG007
0005	5-5.1	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	AB0005
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AB0005
			1,1-Dichloroethane	LT 9. -01	ug/g	AB0005
			1,2-Dichloroethane	LT 3. -01	ug/g	AB0005
			m-Xylene	LT 7. -01	ug/g	AB0005
			Arsenic	LT 5.0 +00	ug/g	ABK008
			Bicycloheptadiene	LT 3. -01	ug/g	AB0005
			Benzene	LT 3. -01	ug/g	AB0005
			Carbon Tetrachloride	LT 3. -01	ug/g	AB0005
			Cadmium	LT 7.4 -01	ug/g	ABG008
			Methylene Chloride	LT 7. -01	ug/g	AB0005
			Chloroform	LT 3. -01	ug/g	AB0005
			Chlorobenzene	LT 3. -01	ug/g	AB0005
			Chromium	1.2 +01	ug/g	ABG008
			Copper	1.3 +01	ug/g	ABG008
			Dibromochloropropane	LT 4. -01	ug/g	AB0005
			Dicyclopentadiene	1. +00	ug/g	AB0005
			Dimethyldisulfide	LT 8. -01	ug/g	AB0005
			Ethylbenzene	LT 3. -01	ug/g	AB0005
			Mercury	LT 5.0 -02	ug/g	ABJ008
			Toluene	LT 3. -01	ug/g	AB0005
			Methylisobutyl Ketone	LT 3. -01	ug/g	AB0005
			Lead	LT 8.4 +00	ug/g	ABG008
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AB0005
			Tetrachloroethene	LT 3. -01	ug/g	AB0005
			Trichloroethene	LT 3. -01	ug/g	AB0005
			Ortho- & Para-Xylene	LT 3. -01	ug/g	AB0005
			Zinc	8.8 +01	ug/g	ABG008
0006	0-1	Soil	Aldrin	LT 3. -01	ug/g	AB0007
			Arsenic	LT 5.0 +00	ug/g	ABK009
			Atrazine	LT 3. -01	ug/g	AB0007
			Cadmium	LT 7.4 -01	ug/g	ABG009

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0006	0-1	Soil	Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABS007A
			Chlordane	LT 6. -01	ug/g	ABS007
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABS007
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABS007
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABS007
			Chromium	1.5 +01	ug/g	ABG009
			Copper	1.1 +01	ug/g	ABG009
			Dibromochloropropane	LT 3. -01	ug/g	ABS007
			Dicyclopentadiene	LT 4. -01	ug/g	ABS007
			Vapona	LT 3. -01	ug/g	ABS007
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABS007
			Dithiane	LT 7. +00	ug/g	ABS007
			Dieldrin	LT 3. -01	ug/g	ABS007
			Endrin	LT 3. -01	ug/g	ABS007
			Mercury	LT 5.0 -02	ug/g	ABJ009
			Isodrin	LT 3. -01	ug/g	ABS007
			Malathion	LT 3. -01	ug/g	ABS007
			1,4-Oxethiane	LT 6. +00	ug/g	ABS007
			Lead	1.4 +01	ug/g	ABG009
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABS007
0006	3.6-3.8	Soil	Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABS007
			Parathion	LT 4. -01	ug/g	ABS007
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABS007
			Zinc	4.2 +01	ug/g	ABG009
			1,1,1-Trichloroethane	LT 3. -01	ug/g	AB0007
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AB0007
			1,1-Dichloroethane	LT 9. -01	ug/g	AB0007
			1,2-Dichloroethane	LT 3. -01	ug/g	AB0007
			m-Xylene	LT 7. -01	ug/g	AB0007
			Aldrin	LT 3. -01	ug/g	ABS009
			Arsenic	LT 5.0 +00	ug/g	ABK011
			Atrazine	LT 3. -01	ug/g	ABS009

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0006	3.6-3.8	Soil	Bicycloheptadiene	LT 3. -01	ug/g	AB0007
			Benzene	LT 3. -01	ug/g	AB0007
			Carbon Tetrachloride	LT 3. -01	ug/g	AB0007
			Cadmium	LT 7.4 -01	ug/g	ABG011
			Methylene Chloride	LT 7. -01	ug/g	AB0007
			Chloroform	LT 3. -01	ug/g	AB0007
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	AB0009
			Chlorobenzene	LT 3. -01	ug/g	AB0007
			Chlordane	LT 6. -01	ug/g	AB0009
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	AB0009
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	AB0009
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	AB0009
			Chromium	1.5 +01	ug/g	ABG011
			Copper	1.7 +01	ug/g	ABG011
			Dibromochloropropane	LT 4. -01	ug/g	AB0007
			Dibromochloropropane	LT 3. -01	ug/g	AB0009
			Dicyclopentadiene	4. +00	ug/g	AB0007
			Dicyclopentadiene	7. -01	ug/g	AB0009
			Vapona	LT 3. -01	ug/g	AB0009
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	AB0009
			Dithiane	LT 7. +00	ug/g	AB0009
			Dieldrin	LT 3. -01	ug/g	AB0009
			Dimethyldisulfide	LT 8. -01	ug/g	AB0007
			Endrin	LT 3. -01	ug/g	AB0009
			Ethylbenzene	LT 3. -01	ug/g	AB0007
			Mercury	LT 5.0 -02	ug/g	ABJ011
			Isodrin	LT 3. -01	ug/g	AB0009
			Toluene	LT 3. -01	ug/g	AB0007
			Methylisobutyl Ketone	LT 3. -01	ug/g	AB0007
			Malathion	LT 3. -01	ug/g	AB0009
			1,4-Oxathiane	LT 6. +00	ug/g	AB0009
			Lead	LT 8.4 +00	ug/g	ABG011
			Dichlorodiphenylethane	LT 3. -01	ug/g	AB0009
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	AB0009

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 2, Site 1-10 South Tank Farm

## Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0006	3.6-3.8	Soil	Parathion	LT 4. -01	ug/g	ABS009A
			2-Chloro-1(2,4-Dichlorophenyl)	LT 3. -01	ug/g	ABS009
			Vinylidene Phosphates			
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AB0007
			Tetrachloroethene	LT 3. -01	ug/g	AB0007
			Trichloroethene	LT 3. -01	ug/g	AB0007
0006	4-5	Soil	Ortho- & Para-Xylene	LT 3. -01	ug/g	AB0007
			Zinc	4.8 +01	ug/g	AB0011
			1,1,1-Trichloroethane	LT 3. -01	ug/g	AB0006
			1,1,2-Trichloroethane	LT 3. -01	ug/g	AB0006
			1,1-Dichloroethane	LT 9. -01	ug/g	AB0006
			1,2-Dichloroethane	LT 3. -01	ug/g	AB0006
			m-Xylene	LT 7. -01	ug/g	AB0006
			Aldrin	LT 3. -01	ug/g	AB0008
			Arsenic	LT 5.0 +00	ug/g	AB0010
			Atrazine	LT 3. -01	ug/g	AB0008
			Bicycloheptadiene	LT 3. -01	ug/g	AB0006
			Benzene	LT 3. -01	ug/g	AB0006
			Carbon Tetrachloride	LT 3. -01	ug/g	AB0006
			Cadmium	LT 7.4 -01	ug/g	AB0010
			Methylene Chloride	LT 7. -01	ug/g	AB0006
			Chloroform	LT 3. -01	ug/g	AB0006
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	AB0008
			Chlorobenzene	LT 3. -01	ug/g	AB0006
			Chlordane	LT 6. -01	ug/g	AB0008
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	AB0008
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	AB0008
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	AB0008
			Chromium	1.5 +01	ug/g	AB0010
			Copper	1.7 +01	ug/g	AB0010
			Dibromochloropropane	LT 4. -01	ug/g	AB0006
			Dibromochloropropane	LT 3. -01	ug/g	AB0008
			Dicyclopentadiene	4. +00	ug/g	AB0006

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0006	4-5	Soil	Dicyclopentadiene	LT 4. -01	ug/g	ABS008
			Vapone	LT 3. -01	ug/g	ABS008
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABS008
			Dithiane	LT 7. +00	ug/g	ABS008
			Dieldrin	LT 3. -01	ug/g	ABS008
			Dimethyldisulfide	LT 8. -01	ug/g	AB0006
			Endrin	LT 3. -01	ug/g	ABS008
			Ethylbenzene	LT 3. -01	ug/g	AB0006
			Mercury	LT 5.0 -02	ug/g	ABJ010
			Isodrin	LT 3. -01	ug/g	ABS008
			Toluene	LT 3. -01	ug/g	AB0006
			Methylisobutyl Ketone	LT 3. -01	ug/g	AB0006
			Malathion	LT 3. -01	ug/g	ABS008
			1,4-Oxathiane	LT 6. +00	ug/g	ABS008
			Lead	LT 8.4 +00	ug/g	ABG010
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABS008
			Dichlorodiphenyltrichloro-ethane	LT 6. -01	ug/g	ABS008
			Parathion	LT 4. -01	ug/g	ABS008
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABS008
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AB0006
0007	0-1	Soil	Tetrachloroethene	LT 3. -01	ug/g	AB0006
			Trichloroethene	LT 3. -01	ug/g	AB0006
			Ortho- & Para-Xylene	LT 3. -01	ug/g	AB0006
			Zinc	4.6 +01	ug/g	ABG010
			Aldrin	LT 3. -01	ug/g	ABZ004
			Arsenic	LT 5.0 +00	ug/g	AAW015
			Atrazine	LT 3. -01	ug/g	ABZ004
			Cadmium	LT 7.4 -01	ug/g	ABE015
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ004
			Chlordane	LT 6. -01	ug/g	ABZ004
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ004
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ004

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.



## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0007	0-1	Soil	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ004
			Chromium	8.4 +00	ug/g	ABE015
			Copper	6.7 +00	ug/g	ABE015
			Dibromochloropropane	LT 3. -01	ug/g	ABZ004
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ004
			Vapona	LT 3. -01	ug/g	ABZ004
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ004
			Dithiane	LT 7. +00	ug/g	ABZ004
			Dieldrin	LT 3. -01	ug/g	ABZ004
			Endrin	LT 3. -01	ug/g	ABZ004
			Mercury	LT 5.0 -02	ug/g	AA011
			Isodrin	LT 3. -01	ug/g	ABZ004
			Melathion	LT 3. -01	ug/g	ABZ004
			1,4-Oxathiane	LT 6. +00	ug/g	ABZ004
			Lead	LT 8.4 +00	ug/g	ABE015
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ004
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ004
			Parathion	LT 4. -01	ug/g	ABZ004
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 3. -01	ug/g	ABZ004
			Zinc	3.8 +01	ug/g	ABE015
0007	4-5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	ABR003
			1,1,2-Trichloroethane	LT 3. -01	ug/g	ABR003
			1,1-Dichloroethane	LT 9. -01	ug/g	ABR003
			1,2-Dichloroethane	LT 3. -01	ug/g	ABR003
			m-Xylene	LT 7. -01	ug/g	ABR003
			Aldrin	LT 3. -01	ug/g	ABZ005
			Arsenic	LT 5.0 +00	ug/g	AAW016
			Atrazine	LT 3. -01	ug/g	ABZ005
			Bicycloheptadiene	LT 3. -01	ug/g	ABR003
			Benzene	LT 3. -01	ug/g	ABR003
			Carbon Tetrachloride	LT 3. -01	ug/g	ABR003

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0007	4-5	Soil	Cadmium	LT 7.4	-01	ABED16
			Methylene Chloride	LT 7.	-01	ABR003
			Chloroform	LT 3.	-01	ABR003
			Hexachlorocyclopentadiene	LT 3.	-01	ABZ005
			Chlorobenzene	LT 3.	-01	ABR003
			Chlordane	LT 6.	-01	ABZ005
			p-Chlorophenylmethyl Sulfide	LT 4.	+00	ABZ005
			p-Chlorophenylmethyl Sulfoxide	LT 7.	+00	ABZ005
			p-Chlorophenylmethyl Sulfone	LT 6.	-01	ABZ005
			Chromium	9.0	+00	ABED16
			Copper	6.3	+00	ABED16
			Dibromochloropropane	LT 4.	-01	ABR003
			Dibromochloropropane	LT 3.	-01	ABZ005
			Dicyclopentadiene	LT 3.	-01	ABR003
			Dicyclopentadiene	LT 4.	-01	ABZ005
			Vapona	LT 3.	-01	ABZ005
			Diisopropylmethyl Phosphonate	LT 3.	-01	ABZ005
			Dithiane	LT 7.	+00	ABZ005
			Dieldrin	LT 3.	-01	ABZ005
			Dimethyldisulfide	LT 8.	-01	ABR003
			Endrin	LT 3.	-01	ABZ005
			Ethylbenzene	LT 3.	-01	ABR003
			Mercury	LT 5.0	-02	AAL012
			Isodrin	LT 3.	-01	ABZ005
			Toluene	LT 3.	-01	ABR003
			Methylisobutyl Ketone	LT 3.	-01	ABR003
			Malathion	LT 3.	-01	ABZ005
			1,4-Oxathiane	LT 6.	+00	ABZ005
			Lead	LT 8.4	+00	ABED16
			Dichlorodiphenylethane	LT 3.	-01	ABZ005
			Dichlorodiphenyltrichloro-ethane	LT 6.	-01	ABZ005
			Parathion	LT 4.	-01	ABZ005
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3.	-01	ABZ005

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0007	4-5	Soil	Trans-1,2-Dichloroethene	LT 3. -01	ug/g	ABR003*
			Tetrachloroethene	LT 3. -01	ug/g	ABR003
			Trichloroethene	LT 3. -01	ug/g	ABR003
			Ortho- & Para-Xylene	LT 3. -01	ug/g	ABR003
			Zinc	3.6 +01	ug/g	ABE016
0008	0-1	Soil	Aldrin	LT 3. -01	ug/g	ABZ008
			Arsenic	LT 5.0 +00	ug/g	AAW019
			Atrazine	LT 3. -01	ug/g	ABZ008
			Cadmium	LT 7.4 -01	ug/g	ABE019
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ008
			Chlordane	LT 6. -01	ug/g	ABZ008
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ008
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ008
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ008
			Chromium	8.9 +00	ug/g	ABE019
			Copper	8.1 +00	ug/g	ABE019
			Dibromochloropropane	LT 3. -01	ug/g	ABZ008
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ008
			Vapona	LT 3. -01	ug/g	ABZ008
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ008
			Dithiane	LT 7. +00	ug/g	ABZ008
			Dieldrin	LT 3. -01	ug/g	ABZ008
			Endrin	LT 3. -01	ug/g	ABZ008
			Mercury	LT 5.0 -02	ug/g	AAO15
			Isodrin	LT 3. -01	ug/g	ABZ008
			Malathion	LT 3. -01	ug/g	ABZ008
			1,4-Oxathiane	LT 6. +00	ug/g	ABZ008
			Lead	1.1 +01	ug/g	ABE019
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ008
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ008
			Parathion	LT 4. -01	ug/g	ABZ008
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ008

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 2, Site 1-10 South Tank Farm

## Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0008	0-1	Soil	Zinc	3.8 +01	ug/g	ABE019
0008	4-5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	ABR005
			1,1,2-Trichloroethane	LT 3. -01	ug/g	ABR005
			1,1-Dichloroethane	LT 9. -01	ug/g	ABR005
			1,2-Dichloroethane	LT 3. -01	ug/g	ABR005
			m-Xylene	LT 7. -01	ug/g	ABR005
			Aldrin	LT 3. -01	ug/g	ABZ009
			Arsenic	LT 5.0 +00	ug/g	AAW020
			Atrazine	LT 3. -01	ug/g	ABZ009
			Bicycloheptadiene	LT 3. -01	ug/g	ABR005
			Benzene	LT 3. -01	ug/g	ABR005
			Carbon Tetrachloride	LT 3. -01	ug/g	ABR005
			Cadmium	LT 7.4 -01	ug/g	ABE020
			Methylene Chloride	LT 7. -01	ug/g	ABR005
			Chloroform	LT 3. -01	ug/g	ABR005
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ009
			Chlorobenzene	LT 3. -01	ug/g	ABR005
			Chloroethane	LT 6. -01	ug/g	ABZ009
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ009
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ009
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ009
			Chromium	LT 6.5 +00	ug/g	ABE020
			Copper	1.4 +01	ug/g	ABE020
			Dibromochloropropane	LT 4. -01	ug/g	ABR005
			Dibromochloropropane	LT 3. -01	ug/g	ABZ009
			Dicyclopentadiene	LT 3. -01	ug/g	ABR005
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ009
			Vapona	LT 3. -01	ug/g	ABZ009
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ009
			Dithiane	LT 7. +00	ug/g	ABZ009
			Diethrin	LT 3. -01	ug/g	ABZ009
			Dimethyldisulfide	LT 8. -01	ug/g	ABR005
			Endrin	LT 3. -01	ug/g	ABZ009

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0008	4-5	Soil	Ethylbenzene	LT 3. -01	ug/g	ABR005
			Mercury	LT 5.0 -02	ug/g	AAL016
			Isodrin	LT 3. -01	ug/g	ABZ009
			Toluene	LT 3. -01	ug/g	ABR005
			Methylisobutyl Ketone	LT 3. -01	ug/g	ABR005
			Malathion	LT 3. -01	ug/g	ABZ009
			1,4-Oxathiane	LT 6. +00	ug/g	ABZ009
			Lead	LT 8.4 +00	ug/g	ABE020
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ009
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ009
			Parathion	LT 4. -01	ug/g	ABZ009
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ009
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	ABR005
			Tetrachloroethene	LT 3. -01	ug/g	ABR005
0009	0-1	Soil	Trichloroethene	LT 3. -01	ug/g	ABR005
			Ortho- & Para-Xylene	LT 3. -01	ug/g	ABR005
			Zinc	4.9 +01	ug/g	ABE020
			Aldrin	LT 3. -01	ug/g	ABZ010
			Arsenic	LT 5.0 +00	ug/g	AAZ005
			Atrazine	LT 3. -01	ug/g	ABZ010
			Cadmium	LT 7.4 -01	ug/g	ABF005
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ010
			Chlordane	LT 6. -01	ug/g	ABZ010
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ010
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ010
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ010
			Chromium	9.7 +00	ug/g	ABF005
			Copper	7.8 +00	ug/g	ABF005
			Dibromochloropropane	LT 3. -01	ug/g	ABZ010
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ010
			Vapona	LT 3. -01	ug/g	ABZ010
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ010

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0009	0-1	Soil	Dithiane	LT 7. +00	ug/g	ABZ010
			Dieldrin	LT 3. -01	ug/g	ABZ010
			Endrin	LT 3. -01	ug/g	ABZ010
			Mercury	LT 5.0 -02	ug/g	AAL017
			Isodrin	LT 3. -01	ug/g	ABZ010
			Malathion	LT 3. -01	ug/g	ABZ010
			1,4-Oxathiane	LT 6. +00	ug/g	ABZ010
			Lead	LT 8.4 +00	ug/g	ABF005
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ010
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ010
			Parathion	LT 4. -01	ug/g	ABZ010
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ010
			Zinc	3.1 +01	ug/g	ABF005
			1,1,1-Trichloroethane	LT 3. -01	ug/g	ABR006
0009	4-5	Soil	1,1,2-Trichloroethane	LT 3. -01	ug/g	ABR006
			1,1-Dichloroethane	LT 9. -01	ug/g	ABR006
			1,2-Dichloroethane	LT 3. -01	ug/g	ABR006
			m-Xylene	LT 7. -01	ug/g	ABR006
			Aldrin	LT 3. -01	ug/g	ABZ011
			Arsenic	LT 5.0 +00	ug/g	AAZ006
			Atrazine	LT 3. -01	ug/g	ABZ011
			Bicycloheptadiene	LT 3. -01	ug/g	ABR006
			Benzene	LT 3. -01	ug/g	ABR006
			Carbon Tetrachloride	LT 3. -01	ug/g	ABR006
			Cadmium	LT 7.4 -01	ug/g	ABF006
			Methylene Chloride	LT 7. -01	ug/g	ABR006
			Chloroform	LT 3. -01	ug/g	ABR006
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ011
			Chlorobenzene	LT 3. -01	ug/g	ABR006
			Chlordane	LT 6. -01	ug/g	ABZ011
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ011
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ011

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0009	4-5	Soil	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ011
			Chromium	LT 6.5 +00	ug/g	ABF006
			Copper	LT 4.7 +00	ug/g	ABF006
			Dibromochloropropane	LT 4. -01	ug/g	ABR006
			Dibromochloropropane	LT 3. -01	ug/g	ABZ011
			Dicyclopentadiene	LT 3. -01	ug/g	ABR006
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ011
			Vapona	LT 3. -01	ug/g	ABZ011
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ011
			Dithiane	LT 7. +00	ug/g	ABZ011
			Dieldrin	LT 3. -01	ug/g	ABZ011
			Dimethyldisulfide	LT 8. -01	ug/g	ABR006
			Endrin	LT 3. -01	ug/g	ABZ011
			Ethylbenzene	LT 3. -01	ug/g	ABR006
			Mercury	LT 5.0 -02	ug/g	AAL018
			Isodrin	LT 3. -01	ug/g	ABZ011
			Toluene	LT 3. -01	ug/g	ABR006
			Methylisobutyl Ketone	LT 3. -01	ug/g	ABR006
			Malethion	LT 3. -01	ug/g	ABZ011
			1,4-Oxathiane	LT 6. +00	ug/g	ABZ011*
0010	0-1	Soil	Lead	LT 8.4 +00	ug/g	ABF006
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ011
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ011
			Parathion	LT 4. -01	ug/g	ABZ011
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ011
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	ABR006
			Tetrachloroethene	LT 3. -01	ug/g	ABR006
			Trichloroethene	LT 3. -01	ug/g	ABR006
			Ortho- & Para-Xylene	LT 3. -01	ug/g	ABR006
			Zinc	2.6 +01	ug/g	ABF006
			Aldrin	LT 3. -01	ug/g	ABZ006

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 2, Site 1-10 South Tank Farm

## Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0010	0-1	Soil	Arsenic	LT 5.0 +00	ug/g	AAW017
			Atrazine	LT 3. -01	ug/g	ABZ006
			Cadmium	LT 7.4 -01	ug/g	ABE017
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ006
			Chlordane	LT 6. -01	ug/g	ABZ006
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ006
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ006
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ006
			Chromium	1.2 +01	ug/g	ABE017
			Copper	7.2 +00	ug/g	ABE017
			Dibromochloropropane	LT 3. -01	ug/g	ABZ006
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ006
			Vapona	LT 3. -01	ug/g	ABZ006
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ006
			Dithiane	LT 7. +00	ug/g	ABZ006
			Dieldrin	LT 3. -01	ug/g	ABZ006
			Endrin	LT 3. -01	ug/g	ABZ006
			Mercury	LT 5.0 -02	ug/g	AAO13
			Isodrin	LT 3. -01	ug/g	ABZ006
			Malathion	LT 3. -01	ug/g	ABZ006
0010	4-5	Soil	1,4-Oxathiane	LT 6. +00	ug/g	ABZ006
			Lead	LT 8.4 +00	ug/g	ABE017
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ006
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ006
			Parathion	LT 4. -01	ug/g	ABZ006
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ006
			Zinc	4.5 +01	ug/g	ABE017
			1,1,1-Trichloroethane	LT 3. -01	ug/g	ABR004
			1,1,2-Trichloroethane	LT 3. -01	ug/g	ABR004
			1,1-Dichloroethane	LT 9. -01	ug/g	ABR004
			1,2-Dichloroethane	LT 3. -01	ug/g	ABR004
			m-Xylene	LT 7. -01	ug/g	ABR004

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.



## Summary of Analytical Results

Task 2 , Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0010	4-5	Soil	Aldrin	LT 3. -01	ug/g	ABZ007
			Arsenic	LT 5.0 +00	ug/g	AAW018
			Atrazine	LT 3. -01	ug/g	ABZ007
			Bicycloheptadiene	LT 3. -01	ug/g	ABR004
			Benzene	LT 3. -01	ug/g	ABR004
			Carbon Tetrachloride	LT 3. -01	ug/g	ABR004
			Cadmium	LT 7.4 -01	ug/g	ABE018
			Methylene Chloride	LT 7. -01	ug/g	ABR004
			Chloroform	LT 3. -01	ug/g	ABR004
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ007
			Chlorobenzene	LT 3. -01	ug/g	ABR004
			Chlordane	LT 6. -01	ug/g	ABZ007
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ007
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ007
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ007
			Chromium	LT 6.5 +00	ug/g	ABE018
			Copper	LT 2.3 +01	ug/g	ABE018
			Dibromochloropropane	LT 4. -01	ug/g	ABR004
			Dibromochloropropane	LT 3. -01	ug/g	ABZ007
			Dicyclopentadiene	LT 3. -01	ug/g	ABR004
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ007
			Vapona	LT 3. -01	ug/g	ABZ007
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ007
			Dithiane	LT 7. +00	ug/g	ABZ007
			Dieidrin	LT 3. -01	ug/g	ABZ007
			Dimethyldisulfide	LT 8. -01	ug/g	ABR004
			Endrin	LT 3. -01	ug/g	ABZ007
			Ethylbenzene	LT 3. -01	ug/g	ABR004
			Mercury	LT 5.0 -02	ug/g	AAO14
			Isodrin	LT 3. -01	ug/g	ABZ007
			Toluene	LT 3. -01	ug/g	ABR004
			Methylisobutyl Ketone	LT 3. -01	ug/g	ABR004
			Malathion	LT 3. -01	ug/g	ABZ007
			1,4-Oxathiane	LT 6. +00	ug/g	ABZ007

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2 , Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0010	4-5	Soil	Lead	LT 8.4 +00	ug/g	ABE018
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ007
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ007
			Parathion	LT 4. -01	ug/g	ABZ007
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ007
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	ABR004
			Tetrachloroethene	LT 3. -01	ug/g	ABR004
			Trichloroethene	LT 3. -01	ug/g	ABR004
			Ortho- & Para-Xylene	LT 3. -01	ug/g	ABR004
			Zinc	6.0 +01	ug/g	ABE018
0011	0-1	Soil	Aldrin	LT 3. -01	ug/g	ABS010
			Arsenic	LT 5.0 +00	ug/g	AAW011
			Atrazine	LT 3. -01	ug/g	ABS010
			Cadmium	LT 7.4 -01	ug/g	ABE011
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABS010
			Chlordane	LT 6. -01	ug/g	ABS010
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABS010
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABS010
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABS010
			Chromium	1.2 +01	ug/g	ABE011
			Copper	8.5 +00	ug/g	ABE011
			Dibromochloropropane	LT 3. -01	ug/g	ABS010
			Dicyclopentadiene	LT 4. -01	ug/g	ABS010
			Vapona	LT 3. -01	ug/g	ABS010
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABS010
			Dithiane	LT 7. +00	ug/g	ABS010
			Dieldrin	LT 3. -01	ug/g	ABS010
			Endrin	LT 3. -01	ug/g	ABS010
			Mercury	LT 5.0 -02	ug/g	AAL007
			Isodrin	LT 3. -01	ug/g	ABS010
			Malathion	LT 3. -01	ug/g	ABS010

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0011	0-1	Soil	1,4-Oxathiane	LT 6.	+00	ABS010
			Lead	1.4	+01	ABE011
			Dichlorodiphenylethane	LT 3.	-01	ABS010
			Dichlorodiphenyltrichloroethane	LT 6.	-01	ABS010
			Parathion	LT 4.	-01	ABS010
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3.	-01	ABS010
			Zinc	5.0	+01	ABE011
			1,1,1-Trichloroethane	LT 3.	-01	AB0008
			1,1,2-Trichloroethane	LT 3.	-01	AB0008
			1,1-Dichloroethane	LT 9.	-01	AB0008
0011	4-5	Soil	1,2-Dichloroethane	LT 3.	-01	AB0008
			m-Xylene	LT 7.	-01	AB0008
			Aldrin	LT 3.	-01	ABS011
			Arsenic	LT 5.0	+00	AAW012
			Atrazine	LT 3.	-01	ABS011
			Bicycloheptadiene	LT 3.	-01	AB0008
			Benzene	LT 3.	-01	AB0008
			Carbon Tetrachloride	LT 3.	-01	AB0008
			Cadmium	LT 7.4	-01	ABE012
			Methylene Chloride	LT 7.	-01	AB0008
			Chloroform	LT 3.	-01	AB0008
			Hexachlorocyclopentadiene	LT 3.	-01	ABS011
			Chlorobenzene	LT 3.	-01	AB0008
			Chlordane	LT 6.	-01	ABS011
			p-Chlorophenylmethyl Sulfide	LT 4.	+00	ABS011
			p-Chlorophenylmethyl Sulfoxide	LT 7.	+00	ABS011
			p-Chlorophenylmethyl Sulfone	LT 6.	-01	ABS011
			Chromium	1.0	+01	ABE012
			Copper	6.7	+00	ABE012
			Dibromochloropropane	LT 4.	-01	AB0008
			Dibromochloropropane	LT 3.	-01	ABS011
			Dicyclopentadiene	LT 3.	-01	AB0008

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

12/19/86

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 2, Site 1-10 South Tank Farm

## Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0011	4-5	Soil	Dicyclopentadiene	LT 4.	-01	ug/g
			Vapona	LT 3.	-01	ug/g
			Diisopropylmethyl Phosphonate	LT 3.	-01	ug/g
			Dithiane	LT 7.	+00	ug/g
			Dieldrin	LT 3.	-01	ug/g
			Dimethyldisulfide	LT 8.	-01	ug/g
			Endrin	LT 3.	-01	ug/g
			Ethylbenzene	LT 3.	-01	ug/g
			Mercury	LT 5.0	-02	ug/g
			Isodrin	LT 3.	-01	ug/g
			Toluene	LT 3.	-01	ug/g
			Methylisobutyl Ketone	LT 3.	-01	ug/g
			Malathion	LT 3.	-01	ug/g
			1,4-Oxathiane	LT 6.	+00	ug/g
0012	0-1	Soil	Lead	LT 1.4	+01	ug/g
			Dichlorodiphenylethane	LT 3.	-01	ug/g
			Dichlorodiphenyltrichloroethane	LT 6.	-01	ug/g
			Parathion	LT 4.	-01	ug/g
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3.	-01	ug/g
			Trans-1,2-Dichloroethene	LT 3.	-01	ug/g
			Tetrachloroethene	LT 3.	-01	ug/g
			Trichloroethene	LT 3.	-01	ug/g
			Ortho- & Para-Xylene	LT 3.	-01	ug/g
			Zinc	LT 4.4	+01	ug/g
			Aldrin	LT 3.	-01	ug/g
			Arsenic	LT 5.0	+00	ug/g
			Atrazine	LT 3.	-01	ug/g
			Cadmium	LT 7.4	-01	ug/g
0012	0-1	Soil	Hexachlorocyclopentadiene	LT 3.	-01	ug/g
			Chlordane	LT 6.	-01	ug/g
			p-Chlorophenylmethyl Sulfide	LT 4.	+00	ug/g
			p-Chlorophenylmethyl Sulfoxide	LT 7.	+00	ug/g

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0012	0-1	Soil	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ002
			Chromium	1.5 +01	ug/g	ABE013
			Copper	8.0 +00	ug/g	ABE013
			Dibromochloropropane	LT 3. -01	ug/g	ABZ002
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ002
			Vapona	LT 3. -01	ug/g	ABZ002
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ002
			Dithiane	LT 7. +00	ug/g	ABZ002
			Dieldrin	LT 3. -01	ug/g	ABZ002
			Endrin	LT 3. -01	ug/g	ABZ002
			Mercury	LT 5.0 -02	ug/g	AAL009
			Isodrin	LT 3. -01	ug/g	ABZ002
			Malathion	LT 3. -01	ug/g	ABZ002
			1,4-Oxathiane	LT 6. +00	ug/g	ABZ002
0012	4-5	Soil	Lead	1.3 +01	ug/g	ABE013
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ002
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ002
			Parathion	LT 4. -01	ug/g	ABZ002
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ002*
			Zinc	3.4 +01	ug/g	ABE013
			1,1,1-Trichloroethane	LT 3. -01	ug/g	ABR002
			1,1,2-Trichloroethane	LT 3. -01	ug/g	ABR002
			1,1-Dichloroethane	LT 9. -01	ug/g	ABR002
			1,2-Dichloroethane	LT 3. -01	ug/g	ABR002
			m-Xylene	LT 7. -01	ug/g	ABR002
			Aldrin	LT 3. -01	ug/g	ABZ003
			Arsenic	LT 5.0 +00	ug/g	AAW014
			Atrazine	LT 3. -01	ug/g	ABZ003
			Bicycloheptadiene	LT 3. -01	ug/g	ABR002
			Benzene	LT 3. -01	ug/g	ABR002
0012	4-5	Soil	Carbon Tetrachloride	LT 3. -01	ug/g	ABR002

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

Task 2, Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0012	4-5	Soil	Cadmium	LT 7.4	-01	ABE014
			Methylene Chloride	LT 7.	-01	ABR002
			Chloroform	LT 3.	-01	ABR002
			Hexachlorocyclopentadiene	LT 3.	-01	ABZ003
			Chlorobenzene	LT 3.	-01	ABR002
			Chlordane	LT 6.	-01	ABZ003
			p-Chlorophenylmethyl Sulfide	LT 4.	+00	ABZ003
			p-Chlorophenylmethyl Sulfoxide	LT 7.	+00	ABZ003
			p-Chlorophenylmethyl Sulfone	LT 6.	-01	ABZ003
			Chromium	LT 6.5	+00	ABE014
			Copper	7.6	+00	ABE014
			Dibromochloropropane	LT 4.	-01	ABR002
			Dibromochloropropane	LT 3.	-01	ABZ003
			Dicyclopentadiene	LT 3.	-01	ABR002
			Dicyclopentadiene	LT 4.	-01	ABZ003
			Vapors	LT 3.	-01	ABZ003
			Diisopropylmethyl Phosphonate	LT 3.	-01	ABZ003
			Dithiane	LT 7.	+00	ABZ003
			Dieldrin	LT 3.	-01	ABZ003
			Dimethyldisulfide	LT 8.	-01	ABR002
			Endrin	LT 3.	-01	ABZ003
			Ethylbenzene	LT 3.	-01	ABR002
			Mercury	LT 5.0	-02	AAL010
			Isodrin	LT 3.	-01	ABZ003
			Toluene	LT 3.	-01	ABR002
			Methylisobutyl Ketone	LT 3.	-01	ABR002
			Malathion	LT 3.	-01	ABZ003
			1,4-Oxathiane	LT 6.	+00	ABZ003
			Lead	LT 8.4	+00	ABE014
			Dichlorodiphenylethane	LT 3.	-01	ABZ003
			Dichlorodiphenyltrichloroethane	LT 6.	-01	ABZ003
			Parathion	LT 4.	-01	ABZ003
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3.	-01	ABZ003

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

## Summary of Analytical Results

**Note:** Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions. Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

12/19/86

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 2, Site 1-10 South Tank Farm

## Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0013	0-1	Soil	Zinc	2.5 +01	ug/g	ABF007
0013	4-5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	ABR007
			1,1,2-Trichloroethane	LT 3. -01	ug/g	ABR007
			1,1-Dichloroethane	LT 9. -01	ug/g	ABR007
			1,2-Dichloroethane	LT 3. -01	ug/g	ABR007
			m-Xylene	LT 7. -01	ug/g	ABR007
			Aldrin	LT 3. -01	ug/g	ABZ013
			Arsenic	LT 5.0 +00	ug/g	AAZ008
			Atrazine	LT 3. -01	ug/g	ABZ013
			Bicycloheptadiene	LT 3. -01	ug/g	ABR007
			Benzene	LT 3. -01	ug/g	ABR007
			Carbon Tetrachloride	LT 3. -01	ug/g	ABR007
			Cadmium	LT 7.4 -01	ug/g	ABF008
			Methylene Chloride	LT 7. -01	ug/g	ABR007
			Chloroform	LT 3. -01	ug/g	ABR007
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ013
			Chlorobenzene	LT 3. -01	ug/g	ABR007
			Chlordane	LT 6. -01	ug/g	ABZ013
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ013
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ013
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ013
			Chromium	LT 6.5 +00	ug/g	ABF008
			Copper	5.0 +01	ug/g	ABF008
			Dibromochloropropane	LT 4. -01	ug/g	ABR007
			Dibromochloropropane	LT 3. -01	ug/g	ABZ013
			Dicyclopentadiene	LT 3. -01	ug/g	ABR007
			Dicyclopentadiene	LT 4. -01	ug/g	ABZ013
			Vapona	LT 3. -01	ug/g	ABZ013
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABZ013
			Dithiane	LT 7. +00	ug/g	ABZ013
			Dieldrin	LT 3. -01	ug/g	ABZ013
			Dimethyldisulfide	LT 8. -01	ug/g	ABR007
			Endrin	LT 3. -01	ug/g	ABZ013

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.



## Summary of Analytical Results

Task 2 , Site 1-10

South Tank Farm

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
0013	4-5	Soil	Ethylbenzene	LT 3. -01	ug/g	ABR007
			Mercury	LT 5.0 -02	ug/g	AAP005
			Isodrin	LT 3. -01	ug/g	ABZ013
			Toluene	LT 3. -01	ug/g	ABR007
			Methylisobutyl Ketone	LT 3. -01	ug/g	ABR007
			Malethion	LT 3. -01	ug/g	ABZ013
			1,4-Oxathiane	LT 6. +00	ug/g	ABZ013
			Lead	1.6 +01	ug/g	ABF008
			Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ013
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ013
			Parathion	LT 4. -01	ug/g	ABZ013
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ013
			Trans-1,2-Dichloroethene	LT 3. -01	ug/g	ABR007
			Tetrachloroethene	LT 3. -01	ug/g	ABR007
			Trichloroethene	LT 3. -01	ug/g	ABR007
			Ortho- & Para-Xylene	LT 3. -01	ug/g	ABR007
			Zinc	1.1 +02	ug/g	ABF008

Note: Results for Dibromochloropropane (DBCP) may appear in up to two analytical fractions.  
 Results for Dicyclopentadiene (DCPD) may appear in up to two analytical fractions.

Blanks Associated with Task 2, Site 1-10  
South Iank Farm Storage Area

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Mercury	LT 5.0 -02	ug/g	AA1001
Blank	Mercury	LT 5.0 -02	ug/g	AA1001
Blank	Aldrin	LT 3. -01	ug/g	AA0010
Blank	Atrazine	LT 3. -01	ug/g	AA0010
Blank	Chlordane	LT 6. -01	ug/g	AA0010
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	AA0010
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	AA0010
Blank	p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	AA0010
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	AA0010
Blank	Dibromochloropropane	LT 3. -01	ug/g	AA0010
Blank	Dicyclopentadiene	LT 4. -01	ug/g	AA0010
Blank	Vapona	LT 3. -01	ug/g	AA0010
Blank	Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	AA0010
Blank	Dithiane	LT 7. +00	ug/g	AA0010
Blank	Dieldrin	LT 3. -01	ug/g	AA0010
Blank	Endrin	LT 3. -01	ug/g	AA0010
Blank	Isodrin	LT 3. -01	ug/g	AA0010
Blank	Melathion	LT 3. -01	ug/g	AA0010
Blank	1,4-Oxathiane	LT 6. +00	ug/g	AA0010
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	AA0010
Blank	Dichlorodiphenyltrichloro-ethane	LT 6. -01	ug/g	AA0010
Blank	Parathion	LT 4. -01	ug/g	AA0010
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 3. -01	ug/g	AA0010
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	AA0001
Blank	Chloroform	LT 3. -01	ug/g	AA0001
Blank	Chlorobenzene	LT 3. -01	ug/g	AA0001
Blank	Benzene	LT 3. -01	ug/g	AA0001
Blank	1,1-Dichloroethane	LT 9. -01	ug/g	AA0001
Blank	1,2-Dichloroethane	LT 3. -01	ug/g	AA0001
Blank	Bicycloheptadiene	LT 3. -01	ug/g	AA0011
Blank	Methylene Chloride	LT 7. -01	ug/g	AA0011
Blank	Dibromochloropropane	LT 4. -01	ug/g	AA0011

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

## Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Blanks Associated with Task 2, Site 1-10  
South Tank Farm Storage Area

## Summary of Analytical Results

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dicyclopentadiene	LT 3. -01	ug/g	AA0011
Blank	Dimethyldisulfide	LT 3. -01	ug/g	AA0011
Blank	Ethylbenzene	LT 3. -01	ug/g	AA0011
Blank	Toluene	LT 3. -01	ug/g	AA0011
Blank	Methylisobutyl Ketone	LT 3. -01	ug/g	AA0011
Blank	Tetrachloroethene	LT 3. -01	ug/g	AA0011
Blank	Trichloroethene	LT 3. -01	ug/g	AA0011
Blank	Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AA0011
Blank	Ortho- & Para-Xylene	LT 3. -01	ug/g	AA0011
Blank	1,1,1-Trichloroethane	LT 3. -01	ug/g	AA0011
Blank	1,1,2-Trichloroethane	LT 3. -01	ug/g	AA0011
Blank	m-Xylene	LT 7. -01	ug/g	AA0011
Blank	Mercury	LT 5.0 -02	ug/g	AA0001
Blank	Arsenic	LT 5.0 +00	ug/g	AA0001
Blank	Arsenic	LT 5.0 +00	ug/g	AA0001
Blank	Arsenic	LT 5.0 +00	ug/g	AA0001
Blank	Cadmium	LT 7.4 -01	ug/g	AB0001
Blank	Chromium	LT 1.5 +01	ug/g	AB0001
Blank	Copper	LT 1.5 +01	ug/g	AB0001
Blank	Lead	LT 8.4 +00	ug/g	AB0001
Blank	Zinc	LT 4.3 +01	ug/g	AB0001
Blank	Cadmium	LT 7.4 -01	ug/g	AB0001
Blank	Chromium	LT 1.5 +01	ug/g	AB0001
Blank	Copper	LT 1.1 +01	ug/g	AB0001
Blank	Lead	LT 8.4 +00	ug/g	AB0001
Blank	Zinc	LT 4.3 +01	ug/g	AB0001
Blank	Cadmium	LT 7.4 -01	ug/g	AB0001
Blank	Chromium	LT 1.7 +01	ug/g	AB0001
Blank	Copper	LT 8.8 +00	ug/g	AB0001
Blank	Lead	LT 1.2 +01	ug/g	AB0001
Blank	Zinc	LT 4.6 +01	ug/g	AB0001
Blank	Cadmium	LT 7.4 -01	ug/g	AB0001
Blank	Chromium	LT 1.7 +01	ug/g	AB0001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Copper	1.1 +01	ug/g	ABG001
Blank	Lead	LT 8.4 +00	ug/g	ABG001
Blank	Zinc	4.6 +01	ug/g	ABG001
Blank	Mercury	LT 5.0 -02	ug/g	ABJ001
Blank	Arsenic	LT 5.0 +00	ug/g	ABK001
Blank	Bicycloheptadiene	LT 3. -01	ug/g	AB0001
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	AB0001
Blank	Chloroform	LT 3. -01	ug/g	AB0001
Blank	Methylene Chloride	LT 7. -01	ug/g	AB0001
Blank	Chlorobenzene	LT 3. -01	ug/g	AB0001
Blank	Benzene	LT 3. -01	ug/g	AB0001
Blank	Dibromochloropropane	LT 4. -01	ug/g	AB0001
Blank	Dicyclopentadiene	LT 3. -01	ug/g	AB0001
Blank	Dimethyldisulfide	LT 8. -01	ug/g	AB0001
Blank	Ethylbenzene	LT 3. -01	ug/g	AB0001
Blank	Toluene	LT 3. -01	ug/g	AB0001
Blank	Methylisobutyl Ketane	LT 3. -01	ug/g	AB0001
Blank	Tetrachloroethene	LT 3. -01	ug/g	AB0001
Blank	Trans-1,2-Dichloroethene	LT 3. -01	ug/g	AB0001
Blank	Ortho- & Para-Xylene	LT 3. -01	ug/g	AB0001
Blank	1,1-Dichloroethane	LT 9. -01	ug/g	AB0001
Blank	1,1,1-Trichloroethane	LT 3. -01	ug/g	AB0001
Blank	1,1,2-Trichloroethane	LT 3. -01	ug/g	AB0001
Blank	1,2-Dichloroethane	LT 3. -01	ug/g	AB0001
Blank	m-Xylene	LT 7. -01	ug/g	AB0001
Blank	Bicycloheptadiene	LT 3. -01	ug/g	ABR001
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	ABR001
Blank	Chloroform	LT 3. -01	ug/g	ABR001
Blank	Methylene Chloride	LT 9. -01	ug/g	ABR001
Blank	Chlorobenzene	LT 3. -01	ug/g	ABR001
Blank	Benzene	LT 3. -01	ug/g	ABR001
Blank	Dibromochloropropane	LT 4. -01	ug/g	ABR001
Blank	Dicyclopentadiene	LT 3. -01	ug/g	ABR001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

## Summary of Analytical Results

Blanks Associated with Task 2, Site 1-10  
South Tank Farm Storage Area

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dimethyldisulfide	LT 8. -01	ug/g	ABR001
Blank	Ethylbenzene	LT 3. -01	ug/g	ABR001
Blank	Toluene	LT 3. -01	ug/g	ABR001
Blank	Methylisobutyl Ketone	LT 3. -01	ug/g	ABR001
Blank	Tetrachloroethene	LT 3. -01	ug/g	ABR001
Blank	Trichloroethene	LT 3. -01	ug/g	ABR001
Blank	Trans-1,2-Dichloroethene	LT 3. -01	ug/g	ABR001
Blank	Ortho- & Para-Xylene	LT 3. -01	ug/g	ABR001
Blank	1,1-Dichloroethane	LT 2. -01	ug/g	ABR001
Blank	1,1,1-Trichloroethane	LT 3. -01	ug/g	ABR001
Blank	1,1,2-Trichloroethane	LT 3. -01	ug/g	ABR001
Blank	1,2-Dichloroethane	LT 3. -01	ug/g	ABR001
Blank	m-Xylene	LT 7. -01	ug/g	ABR001
Blank	Aldrin	LT 3. -01	ug/g	ABSQ15
Blank	Atrazine	LT 3. -01	ug/g	ABSQ15
Blank	Chlordane	LT 6. -01	ug/g	ABSQ15
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABSQ15
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABSQ15
Blank	p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABSQ15
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABSQ15
Blank	Dibromochloropropane	LT 3. -01	ug/g	ABSQ15
Blank	Dicyclopentadiene	LT 4. -01	ug/g	ABSQ15
Blank	Vapona	LT 3. -01	ug/g	ABSQ15
Blank	Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	ABSQ15
Blank	Dithiane	LT 7. +00	ug/g	ABSQ15
Blank	Dieldrin	LT 3. -01	ug/g	ABSQ15
Blank	Endrin	LT 3. -01	ug/g	ABSQ15
Blank	Isodrin	LT 3. -01	ug/g	ABSQ15
Blank	Malathion	LT 3. -01	ug/g	ABSQ15
Blank	1,4-Oxathiane	LT 6. +00	ug/g	ABSQ15
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	ABSQ15
Blank	Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABSQ15

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

## Summary of Analytical Results

Blanks Associated with Task 2, Site 1-10  
South Tank Farm Storage Area

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Parathion	LT 4. -01	ug/g	ABS015
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABS015
Blank	Aldrin	LT 3. -01	ug/g	ABZ001
Blank	Atrazine	LT 3. -01	ug/g	ABZ001
Blank	Chlordane	LT 6. -01	ug/g	ABZ001
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	ABZ001
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	ABZ001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	ABZ001
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	ABZ001
Blank	Dibromochloropropane	LT 3. -01	ug/g	ABZ001
Blank	Dicyclopentadiene	LT 4. -01	ug/g	ABZ001
Blank	Vapona	LT 3. -01	ug/g	ABZ001
Blank	Diisopropylmethyl Phosphonate	LT 3. +00	ug/g	ABZ001
Blank	Dithiane	LT 7. +00	ug/g	ABZ001
Blank	Dieldrin	LT 3. -01	ug/g	ABZ001
Blank	Endrin	LT 3. -01	ug/g	ABZ001
Blank	Isodrin	LT 3. -01	ug/g	ABZ001
Blank	Malathion	LT 3. -01	ug/g	ABZ001
Blank	1,4-Oxathiane	LT 6. +00	ug/g	ABZ001
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	ABZ001
Blank	Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	ABZ001
Blank	Parathion	LT 4. -01	ug/g	ABZ001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	ABZ001
Blank	Dibromochloropropane	LT 5.0 -03	ug/g	ALS001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

## **Appendix 1-10-C**

### **Comments and Responses**



# COLORADO DEPARTMENT OF HEALTH

Richard D. Lamm  
Governor

Thomas M. Vernon, M.D.  
Executive Director

November 21, 1986

Colonel W. Quintrell  
Deputy Program Manager  
RMA Contamination Cleanup  
AMXRM-EE, Bldg. 4585  
Aberdeen Proving Ground  
Maryland 21010-5401

Dear Colonel Quintrell:

Enclosed are our review comments on Tasks 2, 7 and 12, Draft Final Source Reports for the following sites:

## Task 2

Site 1-10	South Tank Farm
Site 1-8	Salvage Yard
Site 2-6	Salt Storage Pad

## Task 7

Section 1	Uncontaminated Areas
Section 2	Uncontaminated Areas

## Task 12

Site 1-2	Upper and Lower Derby Lakes
Site 11-1	Buried Lake Sludge
Site 6-2	Eastern Upper Derby Lake
Site 1-12	Trash Dump
Site 12-2	Rod and Gun Club Pond

If you have any questions on the enclosed comments, please contact Mr. Chris Sutton with the Water Quality Control Division.

Sincerely,

Thomas P. Looby  
Remedial Programs Director

cc: Howard Kenison, Colorado Attorney General Office  
Robert Duprey, USEPA, Region VIII  
Robert Lundahl, Shell Oil Company



RESPONSES TO COMMENTS OF  
COLORADO DEPARTMENT OF HEALTH ON  
DRAFT FINAL CONTAMINATION ASSESSMENT REPORT  
SITE 1-10, TASK 2

Comment 1:  
p. 1-10-26      We disagree with the characterization that "None of the nontarget compounds detected were of sufficient significance to affect Phase II planning." It appears there may be a substantial fuel-related contaminant plume above the water table extending through Borings #1, 2, 4, 5, 6 and 11. The Phase II investigations should be designed to better characterize the extent of this contamination.

Response:      An additional 22 borings and 64 samples are being proposed in Phase II for this site. Of this total, 11 borings will be drilled to analyze for both volatile and semivolatile organic compounds utilizing Phase I methods and a scan for nontarget compounds will be conducted. A soil gas study is also being proposed for Phase II investigations in the entire site area to delineate and define the extent of possible volatile organic contamination.

Comment 2:  
p. 1-10-26      It is not clear that there are sufficient Phase II borings in the vicinity of Borings 3 and 4 to identify the horizontal extent of dieldrin in this area.

One Phase II boring (#18) is insufficient to characterize the vertical and horizontal extent of mercury near Boring #1.

One of the Phase II objectives should be to determine the vertical and horizontal extent of DCPD found in Borings 4, 5 and 6 at up to 200 ppm. One Phase II boring (#16) is insufficient to achieve this objective. More borings should be constructed north and south of these borings.

Response:      Borings 15, 16, 21, and 22 have been added to define the horizontal extent of dieldrin.

Borings 17, 18, 19, and 20 have been added to determine the horizontal and vertical extent of mercury.

Borings 21, 22, and 23 have been added to determine the horizontal and vertical extent of DCPD.

Comment 3: It appears that the vertical extent of contamination extends into the saturated zone at this site. Phase II borings should extend to at least 15 ft below surface beneath the areas of highest contamination with depth.

Response: Monitoring well data from this site indicate that the groundwater is contaminated with organic compounds. We agree that Phase II borings should extend at least to the water table. It was reached at 7.5 feet in Phase I, but many Phase II borings are being planned to 10 feet in the event that the water levels have dropped. If the saturated zone is not reached at 10 feet, the borings will be extended. Groundwater contamination is being related to saturated soils in Task 23.

Comment 4: We disagree that the extent of contamination has been characterized in Phase I and therefore we do not concur with the revised estimates of soil contamination. In particular, the vertical extent should not be reduced from the original 10 ft estimate at this time.

Response: The estimate of soil contamination is for the unsaturated zone only, and is based upon the depth at which the saturated zone was reached during Phase I drilling (7.5 ft).

Shell Oil Company



One Shell Plaza  
P.O. Box 4320  
Houston, Texas 77210

November 17, 1986

USATHAMA  
Office of the Program Manager  
Rocky Mountain Arsenal Contamination Cleanup  
ATTN: AMXRM-EE: Chief: Mr. Donald L. Campbell  
Bldg E4585, Trailer  
Aberdeen Proving Ground, MD 21010-5401

Dear Mr. Campbell:

Enclosed herewith are Shell's comments on the draft final copies of Contamination Assessment Reports for Sites 1-8, 1-10, and 2-6.

Very truly yours,

  
C. K. Hahn  
Denver Site Project

RDL:ajg

Enclosure

cc: USATHAMA  
Office of the Program Manager  
Rocky Mountain Arsenal Contamination Cleanup  
ATTN: AMXRM-EE: Mr. Kevin T. Blose  
Bldg E4585, Trailer  
Aberdeen Proving Ground, MD 21010-5401

Mr. Thomas Bick  
Environmental Enforcement Section  
Land & Natural Resources Division  
U.S. Department of Justice  
P.O. Box 23896  
Benjamin Franklin Station  
Washington, D.C. 20026

Major Robert J. Boonstoppel  
Headquarters - Department of the Army  
ATTN: DAJA-LTS  
Washington, DC 20310-2210

BRHM8631101

RESPONSES TO COMMENTS OF  
SHELL CHEMICAL COMPANY ON  
DRAFT FINAL CONTAMINATION ASSESSMENT REPORT  
SITE 1-10, TASK 2

Comment 1: Paragraph describing 1980 photo. First paragraph of 2.0 History  
p. 1-10-7 states that the pump house was built in 1942.

Response: The pumphouse was built in 1942; the sentence on p. 1-10-7 under  
the 1980 aerial photo description is misleading and has been  
deleted.

Comment 2: The legend title should be revised to: "Analytes Detected  
Figure 3.1-1 Above Indicator Level Range at Site 1-10".

Response: The title of this figure is being revised to read "Analytes  
Detected Within and Above Indicator Levels" in all reports.

Comment 3: DD Soil Fumigant, but not Nemagon, was stored in Tank 463C.  
p. 1-10-8

Response: Our original research showed that Nemagon (Army Interrogatory  
#3) was stored in Tank 463C. We searched our records and agree  
that D-D soil fumigant and not Nemagon was stored here.

Comment 4: The 50,864-gallon spill was reported to be a mixture of  
p. 1-10-9 bicycloheptadiene bottoms and No. 6 fuel oil.

Response: Our research has verified that the 50,864 gallon spill was a  
mixture of bicycloheptadiene bottoms and No. 6 fuel oil. The  
text has been revised.

Comment 5: A triangle of borings should be drilled around Boring 1 to  
Fig. 3.1-2 establish the lateral and vertical extent of mercury  
contamination.

Two borings, one south and one east of Boring 3, should be  
drilled to establish the lateral and vertical extent of  
methylene chloride contamination.

In addition to Boring 15, two other borings should be drilled to  
triangulate Borings 3 and 4 to establish lateral and vertical  
extent of dieldrin contamination. This will also provide a  
triangulation of Borings 4, 5, and 6 to establish lateral and  
vertical extent of DCPD contamination.

Response: Four additional borings have been placed around Boring 1 to determine the vertical and lateral extent of mercury.

Two additional borings have been placed around Boring 3, and Boring 15 have been moved closer to Boring 3 to complete the triangulation.

Borings 21, 22, and 23 have been added to determine the horizontal and vertical extent of DCPD.